Electrical Review

WITH WHICH IS CONSOLIDATED WESTERN ELECTRICIAN AND ELECTROCRAFT.

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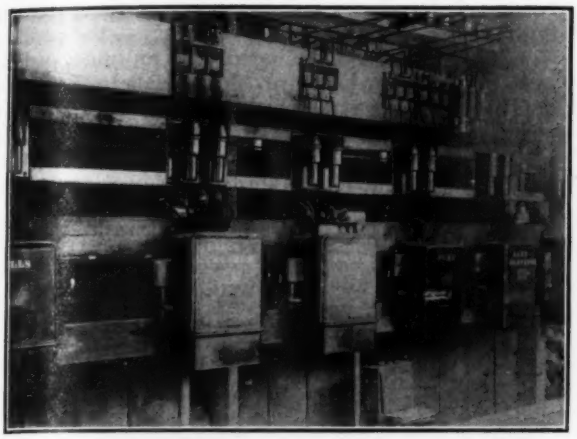
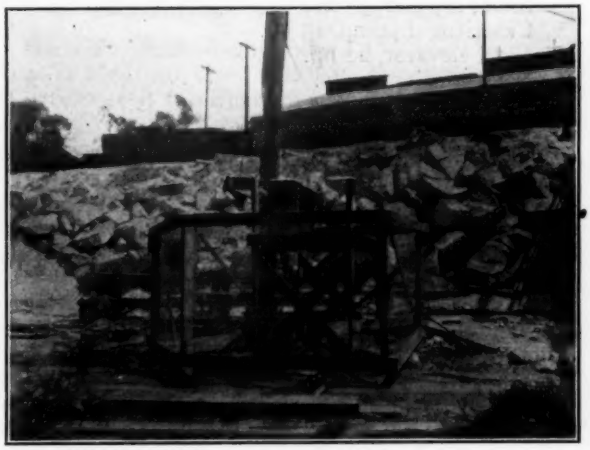


Centralizing Motor Starters at Rock Crushing Plant Enables One Operator to Control All Motors.



Transformers Mounted in Los Angeles River Bed During Construction of Gallery for Pumping Plant.

Electricity Supersedes Steam Pumps in Los Angeles

Saving to City Will Total 18,000 Barrels of Fuel Oil Annually — Other Municipal Departments Adopt Motor Drive

Los Angeles will effect a saving of 18,000 bbl. of fuel oil per year through recent contracts awarded for electrical equipment to be used for operating pumping plants through the city. The city is now using 38,000 bbl. of oil in steam pumping plants which will gradually be replaced by electrically operated equipment. The steam equipment will hereafter be used only in case of emergency.

A further saving of approximately $95,000 will be accomplished by installing a new electrically operated pumping plant at Macy street bridge, in preference to building an additional main. For many years no work has been done in the way of extending or enlarging the water mains in East Los Angeles and Boyle Heights, notwithstanding the growth and development of these sections, with the result that the system so far as pipe lines is concerned, is considerably underbuilt. In considering ways and means to remedy this condition, it was apparent at once that without financial assistance other than the revenues of the department, that the large expenditure, estimated at $150,000, necessary to build a main passing through these two districts from the Buena Vista reservoir would be hopelessly beyond the department's means. An extremely favorable and advantageous remedy offered itself in the increased flow of the Los Angeles river passing the lowest point of diversion at the Buena Vista gallery, and which by proper means could be recovered and effectively filtered in the 1.5 miles reach of river below the Buena Vista plant. The bed of the river in this section consists largely of coarse gravel deposits carried in by the Arroyo Seco and affording by their presence fine opportunity for the construction of a deep filter trench in which to build a percolating gallery, terminating in its lower end at the Macy street bridge. From this point there at present radiate three moderately large mains, traversing the districts above mentioned. It is estimated that this plant, including galleries, machinery and complete pipe connections, will cost when completed approximately $55,000. As a main large enough to effect the same result would cost at normal prices at least $150,000, a saving of $95,000 was effected by this plan and an additional 4,000,000 or 5,000,000 gal. of water daily will be gained.

The pumping equipment for this plant comprises as a first unit, an Allis-Chalmers 12-in. centrifugal pump, direct driven by a 350-hp. Westinghouse motor. This equipment has a rated capacity of 4500 g.p.m. under maximum head of 200 ft. Additional units will be added as required.

Another pumping station recently completed is at Mt. Washington and consists of a Byron Jackson 5-stage centrifugal pump, direct-connected to an Allis-Chalmers 3-phase, 2200-volt, 75-hp. induction motor, with a capacity of 864,000 gal. daily.

All machinery operated by all other departments of the city has been entirely electrified. The street

maintenance and repair department operates electrically-driven machinery totaling 525 hp. in operating an asphalt plant and three rock crushers and gravel and oil-mixing plants.

The largest rock crusher is operated as follows:

Clyde hoist drag line excavator, 75 hp.

Hoist for drawing crushed rock up incline to first crusher, 35 hp.

Large crusher, 35 hp.

Small crusher, 35 hp.

Centrifugal pump, 15 hp.

Sand elevator, 20 hp.

Sand washer, 30 hp.

Rolls, 30 hp.

Feed belt, 15 hp.

The bucket on the drag line excavator, used in connection with this crusher, has a capacity of 1 yd. This excavator operates in the bed of the Arroyo Seco, which is dry about 10 months of the year. The capacity of the plant at present is approximately 225 cu. yd. per day and is now turning out crushed rock at 60 cents per ton and washed sand at 20 cents per ton. A considerable saving in labor was effected by centralizing the motor controls in one place.

This crusher was purchased mainly to supply the municipal asphalt plant with crushed rock. The asphalt plant is electrically operated, having a connected load of 95 hp. The first 26 months that this plant was in operation it effected a saving to the city of approximately $43,000. During that time 709,860 cu. ft. of asphalt surface was produced at an average cost of 13.57 cents per cu. ft., 16,240 cu. ft. of bitulithic mixture at 11.57 cents per cu. ft., and 29,230 cu. ft. of binder mixture at 10.40 cents per cu. ft. It has a daily capacity of 3400 cu. ft.

The first rock crusher placed in service by the city was designed to furnish crushed rock and gravel to be mixed with oil for patching streets. This plant had an output of 15,272 cu. yd. of oiled gravel at a cost of $1.28 per cu. yd. during 1917. In 1915 a second combined crusher and oiled gravel mixing plant was constructed to furnish oiled gravel for street maintenance. Most of the output of this plant is used by the street replacing department in replacing pavements over the excavations made by the public utility companies. During the year 1917 a total of 455,968 sq. ft. of oiled gravel streets were replaced at a cost of $.0956 per sq. ft.

Four departments of the city maintain extensive repair shops, all of which are operated exclusively by electric motors. At the shops of the engineering department a 15-hp. electric motor operates all machines in the machine shop such as lathes, drill press, etc. In the blacksmith shop there is an air compressor operated by a 25-hp. electric motor. The water department maintains extensive repair shops and blacksmith shop, operated exclusively by electric motor. The municipal machine shops, which are said to be models of completeness and efficiency, are operated entirely by electric motor. In addition there has been installed in the machine shop a most complete electrical repair department, where all repairing and recharging of all electrical equipment is made on all city automobiles. There are 275 batteries recharged here each month. The recharging plant consists of a mercury-arc rectifier and a 5-hp. generator. Ignition and lighting systems for all the automobiles are repaired and installed here. All the batteries on the specially equipped squad wagon are recharged here.

This is said to be the most completely equipped wagon in the country. This wagon carries five 250-watt searchlights, with lanterns 16 in. in diameter, capable of throwing a beam of light so strong that a newspaper can be easily read at 500 ft., yet they are so arranged with diffusing lenses that the light does not blind the firemen although they may be but a few feet away. The power for the lights is furnished by eight batteries capable of furnishing current for the lights for 7 hours. The squad wagon is equipped with a generator run by a chain drive from the main propeller shaft of the squad wagon, which can be used to furnish current for the lights, in case it is necessary to operate the lights over 7 hours or in case of injury to the batteries. The squad wagon is equipped with an underload and overload switch which prevents damage to the generator and acts as a governor, the purpose of which is to automatically disengage the charging line from the generator when the rate of charge reaches a dangerous value or when the rate of charge is so low that there would be danger of the batteries bleeding. The generator, of 50 amp., 25 volts, 1.25 kw., is installed on the right footboard of the squad wagon. Three of the high power searchlights are portable and by means of heavily insulated cable carried on a reel which can be unrolled as the lights are carried into a smoke-filled building, the lights can be operated 320 ft. from the squad wagon.

600-Ft. Drag Line Operated by 75-hp. Motor at Crushing Plant.

The fourth department which maintains machine shops operated by electric motor is the Bureau of Power and Water, a description of which was published in the ELECTRICAL REVIEW some time ago.

TENTATIVE COMBINATION OF POWER COMPANIES EFFECTED.

Work on the distribution system in the East Los Angeles-Highland Park-Garvanza district was carried

on until the work was nearly completed, when negotiations for the purchase of the distribution systems within the city of the Southern California Edison Co., the Pacific Light & Power Corporation, and the Los Angeles Gas & Electric Corporation, which had been in progress for several months, resulted in a tentative form of agreement for the combination purchase of these systems. Pending the determination of the question of purchase, it was agreed that the city would discontinue the work of paralleling the systems of these two companies. Prior to this, however, duplicate 33,000-volt transmission lines from the Central Receiving substation to the site of a proposed substation in Hollywood had been built. A substation site had been purchased and some progress had been made in the setting of poles for feeder lines in the Hollywood district.

Following the completion of the work in the Garvanza-Highland Park-East Los Angeles district, and the abandonment of work in the Hollywood district, the construction organization was transferred to the work of building a commercial light and power and street lighting system in the section of the city lying generally south of Exposition boulevard, and the same continued easterly. The street lighting system has been completed and is now in successful operation. The installation of commercial and domestic lighting and power services is also practically completed.

A substation from which this district will be served has been built on property owned by the city at Slauson avenue and Figueroa street. It is known as substation No. 4 and is connected with the central receiving substation by duplicate 33,000-volt transmission lines. Unlike other structures erected by the Bureau of Power and Light, the building housing this station is a frame structure of a temporary character. The system of the Southern California Edison Co. includes several substations in the southern part of the city and in the event of the consummation of the purchase of the companies' systems it is probable that the territory now served from this substation can be served from the existing stations of the Edison company by installing added equipment, thus obviating the construction of an additional substation of a permanent character.

There have also been completed duplicate 33,000-volt transmission lines to the Harbor district for the purpose of serving power to shipbuilding and other industries which are located there. These lines to the Harbor district, together with the duplicate 33,000-volt lines reaching out from the central receiving substation to the Garvanza substation, the proposed Hollywood substation, and the substation at Slauson avenue, constitute a system of high-tension lines encircling the city. In case the purchase of the companies' systems is consummated, these lines will serve to unify the lines of the Edison company, the Pacific Light & Power Corporation, and the existing system of the city.

Immediately following the completion of the first feeder line in the Highland Park-Garvanza-East Los Angeles district, a force of solicitors and service installation crews was organized and the installation of services in residences and business houses begun. In this work the Power bureau organization met with signally successful results which continued until the tentative agreement for the purchase of the companies' distribution system was entered into. As the territory referred to had been served previously almost exclusively by the Pacific Light & Power Corporation, and as one of the provisions of the tentative purchase agreement was that the city should discontinue soliciting business in the sections of the city served by either one of the two companies, pending the final outcome of the purchase negotiations, the work here was abandoned as soon as the agreement was reached.

NEW TRANSMISSION LINE WILL BRING ABOUT THE INTERCONNECTION OF GREAT SYSTEM.

California-Oregon and Pacific Gas & Electric Systems Tied Together by 70,000-Volt Line.

The California-Oregon Power Co., with principal offices at Medford, Ore., will have completed by Nov. 15 a 70,000-volt transmission line, 35 miles in length, extending from Dunsmuir to Kennett, both in California. This line will connect at Kennett with the lines of the Northern California Power Co., and through them will tie in with the Pacific Gas & Electric Co. system. Under this arrangement, the eight hydroelectric plants and 500 miles of transmission lines of California-Oregon Power Co. will be interconnected with the great system to the south, and will be able to deliver to it about 10,000 kw. in electric energy. The new connecting line enables the California-Oregon, which produces a surplus of power, to turn its excess into Pacific Gas & Electric system which has a greater demand than it can supply.

Of the eight hydroelectric stations of the California-Oregon, four are in southern Oregon and four are in northern California. The location and capacity of those in Oregon are as follows: Two on Link river, near Klamath Falls, 600 and 360 kw., respectively; one at Gold Ray, on Rogue river, 12 miles north of Medford, 1500 kw.; one at Prospect, on Rogue river, 50 miles north of Medford, 4700 kw. The four California plants, with the capacity of each, are located as follows: Fall Creek, 2000 kw.; Copco, on Klamath river, 12,500 kw.; Shasta River, 360 kw.; Trinity, on Coffee creek, 180 kw. The newest and largest plant, at Copco, is to be doubled in capacity. The machinery and most all equipment are now on the ground for the installation of a new 12,500-kv.-a. unit.

In this company's territory the largest industrial load, for which installations have been made this year, is the plant and quarry of the Oregon State Lime Board, at Gold Hill, which produces and delivers crushed lime rock to farmers of the state for a fertilizer. In this work the necessary power and light require 115 hp. Another new power consumer is the Gold Hill Mines Association, which requires 48 hp. for motors at its mines and stamp mill; and the Oregon Gas & Electric Co. is installing at Medford an air compressor requiring a 25-hp. motor.

ELECTRIC PUMPING EQUIPMENT ORDERED FOR MEXICAN MINE.

The Alvorado Mining & Milling Co., a subsidiary of the American Engineering & Operating Co., El Paso, Tex., has purchased equipment for an electric pumping plant at its mine at Parral, Mex. The pump is a Byron Jackson centrifugal, of the capacity of 1500 g.p.m., and will be driven by a Westinghouse 200-hp., 2200-volt, three-phase, 60-cycle motor at 1150 r.p.m. The motor is to be set at the 100-ft. level in the mine and pump 200 ft. lower, the motor and pump to be connected by a 200-ft. vertical shaft. The motor station will be above the highest point that may be reached by water. The object is that if operations should be suspended and the mine should thereby be flooded, the pumping operations could be resumed at a later date to unwater the mine without great expense or trouble.

The Electric Furnace After the War

The Effect of the War Upon Electric Furnaces—New Uses to Replace War's Needs—Tendencies in Furnace Design Foretold Before the Electrochemical Society

By FRANCIS A. J. FITZGERALD

The following remarks on the electric furnace after the war do not pretend to be anything more than, first, some observations on the status of the electric furnace today in certain industries with an attempt to deduce what is likely to result therefrom after the war, and, second, a note on the profound effect certain social tendencies which are strongly affected by the war are apt to have an electric furnace development.

War conditions have enormously increased the use of the electric furnace, not only in work where it was already used, but where, before the war, it was not used at all or had only been tentatively adopted. As examples of the increased use of furnaces in work where they were previously used we have the ferro-alloys, steel, abrasives, amorphous carbon and graphite electrodes and in the case of work where their use was not important before the war we have ferromanganese, pig iron, brass and bronze melting, heat treatment of metals, forging, etc.

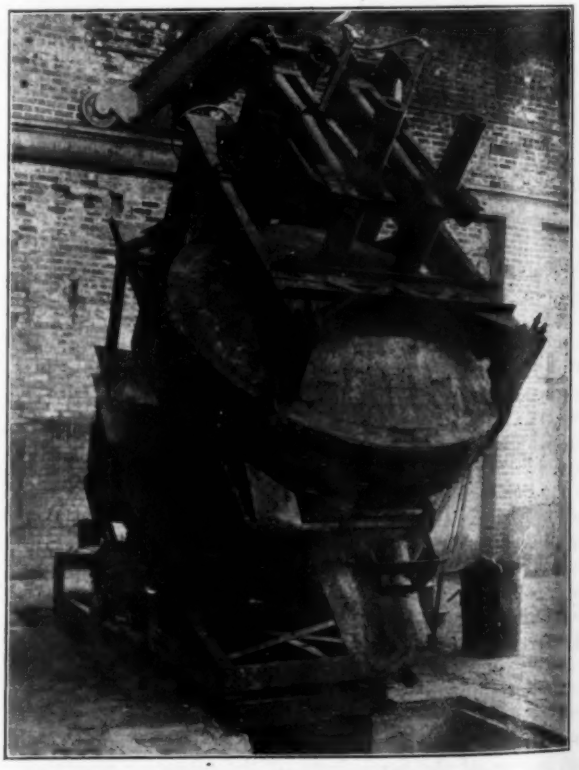
In the ferro-alloy work the increase in electric furnaces is not only found in the factories of those who previously were engaged in this industry, but all sorts and conditions of men, who would never have thought of doing such a thing but for the war, have taken up this class of work. The condition as regards the manufacture of abrasive materials is similar. It is safe to say that some of these activities will cease after the war, for even at this time, in spite of favorable conditions, some have stumbled if not fallen by the wayside.

The use of electric furnaces for steel has been greatly stimulated by the war. This is well illustrated by the number of electric steel furnaces with patented features of various kinds, which apparently are prospering sufficiently to advertise widely. It is probable that the use of steel furnaces would be even greater were it not for the difficulty of getting electrodes and materials for furnace construction.

An obvious hindrance to an even more rapid growth in the use of the electric furnace than actually exists is the relatively small number of experienced electric furnace workers. The electric furnace is too new an apparatus to have provided numerous men trained in its working. The consequence is that there is not, as yet, any standard practice such as is found in other kinds of furnaces which have been in use for many years. Electric furnace practice varies enormously and until there is more experience and more exchange thereof among workers nothing approaching standard practice will be reached. Probably the more severe conditions which will be experienced after the war will bring about this standardization more rapidly.

There is one development of the electric steel furnace which might have been expected as a result of war conditions, but which apparently has not come. This is the use of the induction furnace or its modified form of Röchling-Rodenhauser furnace. These, not requiring electrodes, would apparently offer a means of getting around the electrode shortage and the very high price of electrodes even when they can be obtained. That the induction furnace has good points besides elimination of electrodes there can be no doubt. For example, its thermal efficiency might be made higher than that of any other steel furnace. But it does not seem to have gone ahead in spite of conditions that appeared favorable, one reason being that a satisfactory refractory lining has not been worked out. The lack of men in this country who are experienced in the peculiarities of the induction furnace naturally hinders attempts at working on the problem, particularly under war conditions which do not encourage spending much time on experiments.

Although it looks as though an excellent opening for the induction steel furnace has been missed during the war, I am convinced that interest in it will revive later, because the principle, at least, has apparently been used successfully in the modification of the Hering furnace for the melting of bronze and brass. Ten or twelve years ago when attempts were made to introduce the induction furnace to this country a great deal of experimenting was carried on with a view to its use for brass and copper melting. This was not successful owing largely to the troublesome pinch effect. Dr. Hering, however, utilized the pinch effect in his furnace and showed me, when we were looking at his furnace at the Ajax works in Philadelphia, how

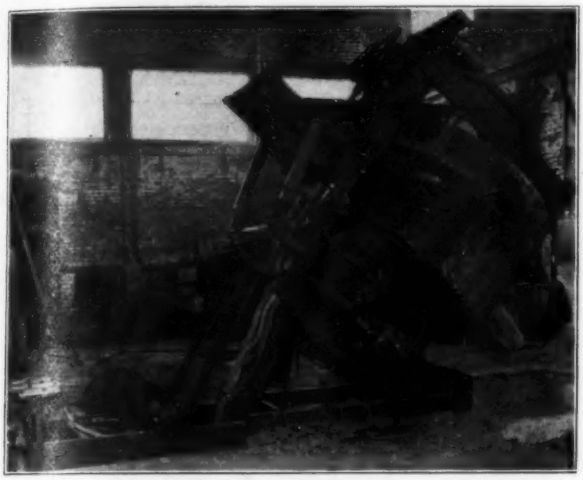


A Three-Ton Three-Phase Furnace in Pouring Position.

the pinch effect could be combined with the induction furnace. Since then a furnace working on that principle has been successfully developed.

Owing largely to the shortage of graphite crucibles and the consequent high expense involved, the development of the electric furnace for brass has been greatly stimulated and now there can be no question that electric brass furnaces will be largely employed.

It would be tedious to catalog all the ways in which the electric furnace is developing, but it is my belief that after the war there will be a still further development for various reasons. One of these is that a large number of people are now being educated in the use and possibilities of the electric furnace. Another reason is that many plants now turning out electric furnace products are only able to do so because of the high prices they get under war conditions. It is almost certain that with the termination of the war a lessened demand or lower prices for many electric furnace products will follow and this will inevitably make some furnace plants apparently useless. This in turn will stimulate the search for other uses to which the idle plants can be put. Many years ago something of the same kind happened in Europe at the time of the acetylene crisis when many plants making calcium carbide were shut down owing to patent litigation. This had a marked effect in developing the use of the electric furnace in the manufacture of ferro-alloys, steel, etc.



Another View of Furnace Tilted for Pouring.

So far, therefore, as the extensive use of the electric furnace is concerned it has been greatly increased by war conditions and for the reasons given it is bound to be still further extended after the war. But when we come to consider the use of electric furnaces in ways that will demand great quantities of power such as the manufacture of nitrates, pig iron, etc., we must take into account certain social tendencies which will have perhaps a controlling influence on their development.

For the successful development of those industries using large quantities of electric energy, water-power developments are necessary and no one who is interested in these can have failed to observe the growing popularity of the idea of putting them under government ownership. This is almost certain to interfere with the growth of the electric furnace in the industries considered.

Under an autocratic government state ownership has some possibility of success. Assuming that competent men who take a keen interest in their work are in charge of a government hydroelectric development, there is no reason why it should not be worked on good principles so long as that is the desire of the government. Those in charge must satisfy their employer very much as though they were in charge of a privately owned enterprise and had to satisfy their employers—the stockholders. The case, however, is very different under a democratic government. Here the people are the employers, taking the place of the stockholders in the privately owned enterprise, and the government must satisfy them or rather the majority of the voters. Now, in the case of the privately owned enterprise the stockholders have a very simple measure of the efficiency of their managers—dividends. If these are not satisfactory the stockholders will demand reasons. In the case of government-owned hydroelectric plants there is no measure of this kind. The man who does not use electric current will probably not consider the matter at all; the man who does use current will measure the efficiency of the management by the price he pays for it. The consequence is that the managers of the government-owned hydroelectric plant must, if they would hold their jobs, see to it that the majority of the plant's customers get their current at the lowest price possible. Usually the majority of the plant's customers will be small users—the householder, the farmer, etc.—and it is evident that these must be satisfied even at the expense of the small number of customers of the plant who are large users. This is what is bound to happen in the case of government ownership of hydroelectric plants, for the small users, the majority of the voters, will by no means be willing to trust the government in the matter of just rates, they will put in that government which will give them low rates, however inequitable and actually injurious these may be. Government ownership of hydroelectric systems is, therefore, the most serious menace to the future of the electric furnace so far as the larger developments are concerned. It will take years to teach the farmer and small householder that the actual cost of supplying them with electric current is enormously greater than that of supplying the factory using thousands of horsepower and that when they get a low price for their current at the expense of the large user it is no real benefit to them since they more than pay for what they save in current by the increased cost of other things just as essential to their lives.

The government ownership of water powers is only one of many kindred problems which we must face immediately. There is probably yet time to avert the disastrous results which would follow such a policy and fortunately we have in the Ontario Hydroelectric Commission a large scale experiment in government ownership well worthy of study.

We are fighting in a great war between two principles of government—that in which the people exist for the state and that in which the state exists for the people. We have no doubt which side will win, but if as a result of that victory we destroy a Socialistic Autocracy in order to set up ourselves a Bolsheviki Bureaucracy, the last state of humanity may be worse than the first.

Pig-iron is now being cast from electrically-operated furnaces in several parts of British Columbia, and the experiment has proved a great success. One firm with electric furnaces has received orders amounting to 2000 tons of pig-iron, a large proportion of which is intended for Japan.

TWIN PEAKS TUNNEL COMPLETED IN SAN FRANCISCO.

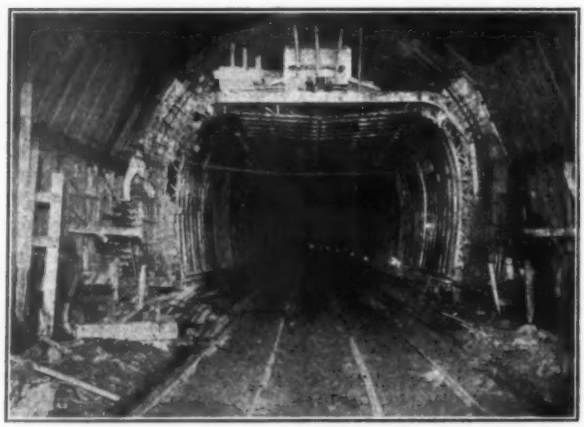
New Municipal Traction Project Thoroughly Modern in Every Respect—Electric Drive Used Extensively in Construction.

The completion of the Twin Peaks tunnel in San Francisco ranks as one of the most expensive and spectacular engineering feats of this year. This tunnel which was constructed by the Municipal Railway Company is 12,000 ft. in length, 25 ft. wide and 25 ft. high, except at the terminals where it is considerably larger, and represents an outlay of about $4,470,000. It connects the Laguna Honda station with the Eureka Valley station located at 17th and Castro streets by a direct route under the Twin Peaks. Formerely the Laguna Honda section of the city could only be reached by a roundabout way which required about 30 minutes. By using the tunnel, however, the trip is now made in about 6 minutes.

The electrical equipment of the tunnel is modern in every respect. All the wires in the tunnel are installed in conduit, over 45 miles of conduit and duct being required for the installation. There are ten 3½ in. ducts and one ¾ in. galvanized conduit built into the side walls of the tunnel. These conduits are arranged with the lighting conduit on top, the trolley feeders next and the balance are used by the public service companies.

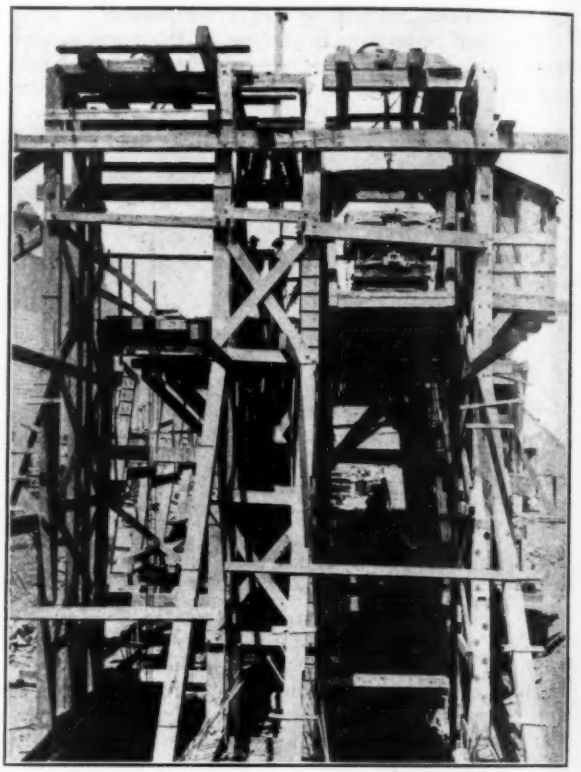
Every 400 ft. throughout the tunnel there were niches in the concrete side walls about 24 in. deep, 4 ft. wide and 5 ft. 6 in. high and about 18 in. above the tunnel floor. Here the conduits are brought to the surface so that access can be had to the conduits for tapping off and feeding out. These niches are lighted by 40-watt lights. At every third niche or 1200 ft. a tap is made to the trolley feed-wire. The conduits are of sufficient size to permit the wires being drawn in or out without difficulty. Before the concrete was poured the conduits were tested with an air pump. The test required the conduit to be sufficiently air tight to maintain a pressure equal to 2 in. of mercury without.

An unusual feature is the indirect lighting system.



View of Interior of Tunnel During Construction, Showing Conduit Arrangement on Side Walls.

Every 50 ft. throughout the tunnel there are niches in the walls something like the ones that are placed every 400 ft. mentioned previously, only smaller. In each of these niches there is placed a 40-watt light set back 18 in. so that its light will not strike the motorman's eyes. This reflects a soft general light throughout the tunnel. No globes being in sight, all blinding effect is eliminated. The niches are also used as safety bays for the track walkers. The ¾-in. galvanized conduit carries No. 14 lead-covered conductor cable which is fed from the deep niches every



Double Deck Elevator Used in Constructing Eureka Valley Station.

800 ft. and connects with the lights in the lighting niches every 50 ft. in the tunnel. A switch is placed every 800 ft. which controls the lights in either direction for 400 ft., thus making one switch for every 14 lighting niches. There are 36 100-watt lights in each loading platform, and 80 altogether at the upper and lower levels of the two stations. These lights are equipped with shades and are set in the concrete.

All wires used in the various circuits are of soft annealed copper and have a conductivity of not less than 95% of pure copper for single strands. Current for electric light is distributed at 115 volts by a three-wire multiple system from cutout cabinets. All cut-out cabinets are of sufficient size to receive a three inch gutter between the inside of the box and the outside of the lining on all sides and allow the door to close, when switches are at right angles to the board. All boxes are satin finished with slate 1-in. thick for the back and ¾-in. for top, bottom and sides. Cabinets are constructed for three-wire mains and for two more tap circuits of 115 volts. All service switches are of remote control. When two or more switches are located at same point they are covered by one plate.

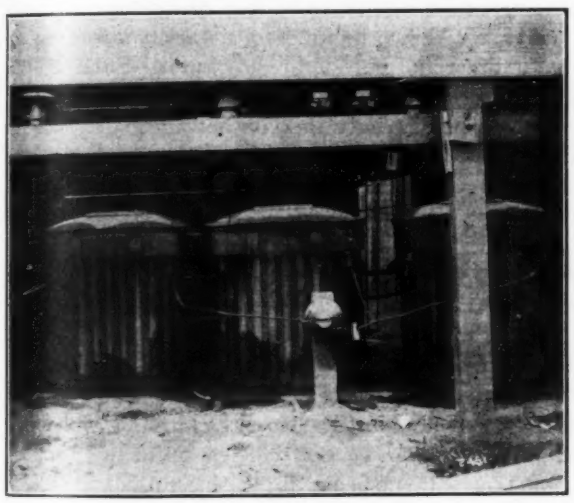
Permanent manholes are placed at 18th and Hattie streets and at Laguna Honda station. The current is taken from a pole line and feeds all lights and trolley east of 18th and Hattie and for 2000 ft. west of 18th and Hattie through the manhole located at 18th and Hattie. The remainder of the system is fed from

the manhole at Laguna Honda. At present the permanent transformers are supported on poles at Laguna Honda and 18th and Hattie. These reduce the lighting current from 2200 to 110 volts. The current for the trolley is direct current at 600 volts.

There are two ventilating shafts where electrically operated fans will be placed in pent houses at the surface. These fans will force fresh air into the bore from the main ventilating tube which is between the concrete crown of the tunnel and the false roof also of concrete.

The Laguna Honda station is peculiarly constructed to meet the extreme condition which exists at this particular point. The surface station built of reinforced concrete is 65 ft. above the main tunnel section, which is located at this distance underground. Entrance is effected into the surface structure where a battery of electrically operated elevators carry traffic to the lower station level. These elevators have a capacity of 50 persons, are operated by 75 hp. electric motors and require about 30 sec. to make a trip.

In the construction of the tunnel motors totaling 750 hp. were used for driving the machinery used in the various kinds of work. Three air compressors were used, one of 1120 cu. ft. capacity operated by a 200-hp. motor and two of 750 cu. ft. capacity operated by 150-hp. motors. In addition to this all the elevators, hoist, mixers, pumps, etc., were electrically operated. One especially novel feature of the construction was the installation of an automatic indicator on the elevator which recorded the number of loads of muck unloaded at the office of the superintendent ½ mile away.



Bank of Transformers in Temporary Substation.

ADOPTION OF MODERN METHODS ENABLES INDIA TO MEET WAR CONDITIONS.

Progress Made During War Along Electrical and Other Industrial Lines Proves Big Surprise.

If the progress in industrial development made by India during the last four years can be regarded as a criterion of future development, export manufacturers may expect to find a large portion of the foreign trade for the next few years coming from this country. For years the possibilities in the application of modern methods to the great resources of this country have been realized and developed with comparative rapidity. The outbreak of the war, however, forced this development even more rapidly than before and the result has been that the progress along industrial lines made by India during this time has been one of the surprises of the war.

Since 1914, 705 new manufacturing companies having a total authorized capital of $192,931,060 have been formed, in addition to numerous increases made by existing companies. Although still dependent to a large extent upon outside sources for manufactured goods, this increase in factories which seems to be growing larger every year, has done much to put the country on a self-supporting basis. Before this can be entirely accomplished, however, great quantities of machinery must be imported.

The development of electrical projects, however, has been unusually slow in comparison with the rapid advances made in other lines. There are now only 28 central stations with an aggregate capacity of 104,270 kw. In addition, there are 105 private plants with a capacity of more than 200 kw. and 397 smaller plants.

However, there are a number of plants of unusual size and importance under way at present and it is expected that the development of the electrical resources will receive more attention from now on. The principal undertaking so far is the Tata Hydroelectric Power Co. at Bombay. This plant which when completed will have a capacity of 60,000 hp., is being carried out at an estimated cost of $8,000,000. Power will be obtained from three great reservoirs having about 10,000,000,000 gal. capacity. A large part of this plant is already completed, some sections having been in use since February, 1915.

In the native state of Mysore another plant is to be built at Cauvery Falls. The first plant at this location will be remembered as being one of the most important long-distance transmissions in existence at the time it was designed. Other plants are also being constructed at Karachi and Ahmadabad.

A considerable portion of the equipment in use in these plants as well as that already contracted for has been made by American manufacturers. At the Tata project and at Cauvery Falls nearly all the apparatus was designed and built by the General Electric Co. In addition to generating equipment a very large number of American-made electric fans are being used wherever possible, the superiority of this equipment over the native method of fanning with huge leaves by coolies having been quickly recognized by the natives.

Another industry which has been given considerable impetus on account of the war is the iron and steel works. Great progress had been made in this work prior to 1914 but the growth since then has been phenomenal. The assured future growth of this industry promises to do much to promote the development of the electrical industries there as many new plants and blast furnaces are being erected in which the most modern equipment will be installed.

In countless other ways India is preparing not only to put that country on a more nearly self-supporting basis but further to take her part in the world trade after the war. Many new industries are being introduced and experts are being sought after in order that they may be established along the most modern lines. Banking and other trade connections are being built up in counties where any part of their prospective trade is expected to come from. In all these preparations as well as in the past growth India looks to America for ideas and help as much to England.

Editorial Comment

War's Passing Emphasizes the Responsibilities of Peace

JUST as we go to press come the glad tidings of the conclusion of an armistic with the last of our foes. Universal rejoicing has for the moment caused us almost to lose our heads. The greatest war of the world is now virtually at an end. We must not forget, however, that peace has not yet been concluded and that no opportunity must be lost to insure that that peace will be a just and enduring one.

The entrance of our country into the war has put a different complexion on its end than probably would have been the case without our help. This has brought us great international prestige that should not be lost. There is still much to be done to make the world's gratitude to us permanent. Many famished nations must be succored and our food supplies extended to them. The reign of terror in Russia must be put down. True democracy must be set up in every country on the globe and the possibility of recurrence of war made remote.

Peace will bring to us almost greater responsibilities than has war. The world is looking to us for guidance and help and we should therefore waste no time in rejoicing, but buckle down to our responsibilities so as to merit the extraordinary standing we now hold. Electrical men, always progressive, can and should take a leading part in the reconstruction work now awaiting to be done.

Improving the Efficiency of Lighting Fixtures

TWO months ago the United States Fuel Administration issued its now famous order calling for the gradual but ultimately almost complete replacement of carbon and metallized-filament lamps by tungsten-filament lamps and urging the substitution of the gas-filled for vacuum tungsten lamps of 100 watts and over. This order was clearly a big step in advance in lighting efficiency and was generally heralded by lighting men as a more effective means of promoting fuel economy than some of the lighting curtailment measures put into effect during the past year. As a logical sequel to this order there has recently been issued by the Fuel Administration a call upon fixture manufacturers to so modify old designs of fixtures as to make them better suited for the more efficient lamps.

This is another progressive step, provided it is carried out with due regard to generally well recognized principles of illuminating engineering. Unfortunately, as is only too evident from a casual inspection of the stock of the average fixture dealer, there are among fixture designers still quite a few who evidently have only a meager knowledge of the principles of good illumination. If these chaps are turned loose without guidance on the redesign of some of their former abominations, there is no assurance that their revised designs will represent improvement or the reverse. The greater is this danger because the larger and more efficient lamps are necessarily lamps of higher intrinsic brilliancy and their effective utilization requires therefore much greater care to prevent serious glare.

For industrial, street and commercial lighting there are now available numerous types of fixtures that employ large gas-filled tungsten lamps very effectively. They range from various types of enameled steel or glass reflectors and more or less completely inclosing fixtures for direct lighting to a variety of types of semi-indirect and pure indirect fixtures. Some of the fixtures used with these lamps are far from satisfactory, however, because they do not adequately screen the brilliant light rays and in other cases are also inefficient from the physical standpoint in that too much light is wasted in useless directions.

In redesigning fixtures for higher efficiency it is to be hoped that the word "efficiency" will be interpreted broadly. Of what avail is high physical efficiency of a unit if it does not result in high visual efficiency? Good distribution of the light and freedom from glare are as important factors in efficient utilization of light as is high efficiency of the bare lamp itself. Moreover, a lighting unit can be very efficient from this broader standpoint without being displeasing to look at.

The fact is that many fixture designers need the help of illumination experts. It may be well, therefore, for a committee of the Illuminating Engineering Society to co-operate with the Fuel Administration and the fixture manufacturers in giving general guidance to the latter on the important principles of illumination that should not be overlooked in the redesign of fixtures or the development of entirely new designs.

Educate the Public Before a Public Utility Referendum

EVILS in the early public utility history of this country have a habit of rising like a family skeleton to darken the reputation of present utility interests and impede progressive developments of the greatest value to the public as well as to the utilities themselves. When a constructive measure is proposed that includes fair consideration of the rights of the utility, there is apt to be a rattling of the old dry bones

of the skeleton in the closet, accompanied by raising of the cry, "Steal." The public is not always discriminating when its interests are at stake and is likely to jump to the conclusion that a possible taint in the utility's ancestry must necessarily be inherited by the present owners and managers. A criminal is given the benefit of the doubt when there is no clear case against him, but a public utility not only has not this protection but usually is even suspected of ulterior motives when it is offering to bring about an important public improvement.

A marked example of this suspicious attitude of the public toward public utility matters that it does not understand was the defeat at last Tuesday's election of the traction unification ordinance which was submitted to referendum approval of the voters in the city of Chicago. This ordinance was the result of some three years' work by noted electrical engineers, legal experts and the progressive majority in the City Council to bring about much needed additional urban transportation facilities through a consolidation of all the street railway and elevated railroad companies and the construction of a great many miles of new elevated and subway rapid-transit lines and surface feeders. This ordinance, covering all of the present traction lines and those proposed in a six-year construction program, was necessarily a voluminous document of over 100 printed pages. It possessed a number of innovations, of which one was the organization of the new company "not for profit" and without stockholders, but directed by a board of nine trustees to render "service at cost," this to include all usual operating and maintenance costs and interest at about 6 per cent on the funds actually invested in the properties. The ordinance was substantially an indeterminate franchise, terminable at any time by the city at six months' notice of desire to purchase the system. All surplus was to go into an amortization fund that could be used for gradual extinction of the private equity in the system or for the construction of further extensions that would be city-owned, the plan being that within possibly 50 years all of the system would in this way come into the full ownership of the city without issuing any municipal bonds or levying a cent of taxes.

From this very brief summary of the salient features of the ordinance it is evident that it was an extremely liberal and constructive measure, from the standpoint of real public interest; in fact, so progressive as to be considerably ahead of the times. This very fact, however, was one of the things that led to the public mistrust. But the chief element in the defeat of this project was the inability of the public to understand it clearly. In spite of numerous public hearings and explanatory pamphlets prepared by the council committee that had the ordinance in charge, there was little general understanding of its main features. On the contrary, the opportunity was seized by a few well-meaning but misinformed reformers and by numerous outright demagogs and self-seeking politicians to misrepresent and denounce many provisions of the ordinance. In a brief but spirited campaign there was no time to inform the public of the true import of the measure and correct the many falsehoods that had been widely spread and readily accepted because of shady traction history in years gone by.

The present traction case illustrates very forcibly the need for educating the public on public utility matters in which it is concerned, and especially before submitting a proposition to a referendum vote. The public in general has little conception of the meaning of such terms as capital account, amortization fund, depreciation reserve, valuation, fixed charges, etc. Public utility problems are not generally understood by the average citizen and particularly in a very large city where questions of engineering, finance and public policy are intricate and require a great deal of study by the most noted experts to work out an economic and equitable solution. In presenting a case for a new franchise, for rate increases, for important line extensions or service betterments, it is essential that the public be given a clear and candid explanation of the problems involved and how it is intended to solve them. Leaflets distributed to the patrons of the utility, newspaper advertising or other suitable means of publicity should be utilized in order that a fair idea of the issues may be presented to the public before professional agitators can seize the opportunity to distort facts and make capital for their nefarious campaigns.

Fuel Saving in Fact

ACCORDING to reports issued by the United States Fuel Administration, the industrial plants following the recommendations of the Administration have saved coal at the rate of seven million tons of coal per annum. That is to say, for the first six months from the announcement of the national program, three and one-half million tons of coal have been conserved. It should also be emphasized that this has been accomplished without in any way curtailing production in these plants.

By adopting the standard recommendations of the Administration and keeping systematic records, a number of plants had a fuel saving of 25 per cent, with an average saving estimated between 10 and 15 per cent. One of the most enlightening and encouraging facts brought out is the fact that this large saving has been effected at practically no expense to the plant owners, since the recommendations treat primarily of proper methods of firing and management in power plants.

The cost of fuel is the highest item of expense in the production of power from fuel. If this item can be reduced from 10 to 25 per cent by a little care, with further improvement to be expected by use of improved apparatus, the importance of obtaining this saving is obvious. The argument to save coal as a patriot is a sound one. But the argument to save coal simply as a business proposition is one that is convincing and lasting.

Week's Events

Fixture Manufacturers to Redesign Lamp Fixtures—Passage of Sims Bill Protested by Exporters — Other Items

FIXTURE MANUFACTURERS REQUESTED TO REDESIGN FIXTURES FOR MODEN LAMPS.

Fuel Administration Seeks Development of Designs Suitable for Single, Large, Efficient Lamps.

To further its campaign of fuel conservation through more efficient lighting, which resulted in the recent order to lamp manufacturers to practically discontinue the making of carbon-filament lamps, the United States Fuel Administration, through its Bureau of Conservation, has sent the following letter to manufacturers of electric fixtures:

"The United States Fuel Administration is promulgating a program of fuel conservation through the elimination of inefficient types of incandescent electric lamps. Under this program the lamp manufacturers are called upon to abandon the manufacture of standard carbon-filament lamps of 20, 60 and 120 watts; of 30 to 60 watts round bulb; and of all standard-base carbon "decorative" types, all of the 100-130-volt range. Central stations are called upon to abandon the renewal of carbon-filament and metallized-carbon-filament (Gem) lamps, and in general to bring about the use in all installations of the most efficient types of lamps available for the service.

"You are advised of this program in order that you adapt the design of fixtures accordingly.

"The United States Fuel Administration requests your co-operation in so designing fixtures as to further the use of the most efficient types of lamps, particularly the employment of single large lamps rather than a number of smaller lamps of lower efficiency.

"Your hearty co-operation in rendering effective this conservation program is requested."

PROF. C. A. ADAMS ON ELECTRIC WELDING.

Talk on Ship Welding Developments to Be Delivered Before A. I. E. E. at Cleveland.

Prof. C. A. Adams, president of the American Institute of Electrical Engineers, will address the Cleveland section at the next meeting on the subject, "Recent Developments in Electric Welding as Applied to the Building of Ships." This meeting will be held in the Electrical League rooms in the Statler hotel, Nov. 19. As chairman of the Welding Committee of the U. S. Shipping Board, Emergency Fleet corporation, Professor Adams is particularly well fitted to speak on the progress which has been made in the use of electric welding in shipbuilding and the possibilities in the future field of this work. On account of the great interest which is being displayed in this branch of electrical work at this time, considerable attention has been attracted by this meeting, not only among the Institute members, but outside engineers as well and a big attendance is expected.

THE SIMS BILL A TWO-EDGE SWORD.

Established Export Manufacturers Protest Passage of Alleged Patriotic Measure.

By Leon E. Joseph.

There are a great many Americans who do not concern themselves whether or not Germany is to be boycotted after the war, but who are so disgusted with her atrocities and conduct in general that if the only meal they could get for dinner was made in Germany, they would go hungry; if the only shoes they could get to cover their feet were made in Germany, they would go unshod; if the only hat they could get was made in Germany, they would go bare-headed. This feeling has aroused a nation-wide desire to provide some definite means to differentiate German-made goods from others. This is one of the basic principles that caused the introduction of the Sims bill, though this bill has gone farther and has provided for the adoption of a national trade-mark by which American-made goods shall be designated.

This trade-mark is to be registered as a trade-mark in all foreign countries having trade-mark laws. The right to use it is to be granted by license from the Secretary of Commerce. The bill does not provide any restrictions as to who shall have the privilege of using this trade-mark, Section VI thereof reading, "that the Secretary of Commerce is authorized upon application to him by any manufacturer or producer in the U. S. A. to issue a license." This does not exclude foreigners resident in the United States, or corporations controlled by foreign capital.

The bill as introduced into the Senate by Mr. Pomerene adds to manufacturer and producer the word "merchant." This addition will defeat any good that there might be in the original bill as a merchant, whether he is a jobber or retailer, has no positive knowledge as to where the goods he buys are manufactured other than the word of the seller and to give him the authority to brand goods that he handles with the national trade-mark, "made in U. S. A." would be an injustice to all American manufacturers.

The bill does not provide that the branding of the merchandise or container with the copyrighted "made in U. S. A." must be done at the place of manufacture, or even in the United States, and if a trading concern is able to procure a license to use this brand it will be practically impossible to prevent them from branding goods made in Germany and sold in Buenos Aires that never saw our shores with those three letters that are so dear to the heart of every true American.

This and other provisions of the bill have caused a storm of protest from many of the large American manufacturing exporters. They have blazed trails in the foreign countries and have established their business against big handicaps and at a large expense and they see in this bill the means by which other American manufacturers, not so venturesome or liberal with

their funds, may be able to derive benefits that the pioneers paid for.

Concerns that have already established foreign trade would sooner rely upon their own trade-marks for the increase of business and favorable attention than on any national trade-mark. This is especially true of manufacturers of "quality" products. The firm new to foreign trade, especially those manufacturing an inferior product, might hope for benefit by the national trade-mark as it would show a uniform branding of their merchandise with that of the quality merchandise already established.

Every manufacturer who does any export business in electrical lines is recommended to obtain copies of both the Sims bill, which is No. HR10366 and the Senate bill, No. S4458. Read them both carefully, have your lawyers read them and find out just what effect their passage would have on the investment you have made in foreign trade. Then if you come to the conclusion that they are a detriment to your business and established export business in general it is your duty to so acquaint your senator and representative in order that he has proper guidance for his conduct when the bill comes up for discussion.

BROOKLYN ELECTRICAL COMMITTEE EXCEEDED LOAN QUOTA BY 140 PER CENT.

Electrical Interests of Brooklyn Give Enthusiastic Support to Liberty Loan.

Obeying the mandate, "double the Third," the Brooklyn Electrical Industries committee, under the chairmanship of T. I. Jones, of the Brooklyn Edison Co., reports that approximately $2,500,0000 in subscriptions were obtained toward the Fourth Liberty Loan through its efforts. This committee consisted of: T. I. Jones, chairman; M. S. Seelman, Jr., secretary; E. W. Babcock, H. P. Erwin, H. W. Drake, J. C. Forsythe, H Gerlach, H. T. Hochhausen, Louis Kalischer, G. L. Knight, W. L. MacDaniel, J. C. McDonagh, O. F. Quist, William Walsh, George Weiderman, W. H. Wells.

The committee was divided into various subcommittees and no effort was spared to obtain subscriptions, both large and small. The total subscriptions obtained in the Third Loan by this committee totaled $1,000,000, which was also their quota for this loan.

The Brooklyn Edison Division, which secured $1,219,650, conducted special campaigns during every day of the Liberty Loan drive. Certain groups of salesmen visited the plants of large manufacturers in the borough of Brooklyn and addressed noon-day meetings. Many a firm secured a 100% flag through the direct efforts of these men. Other groups went out on a noon-truck to the various industries centers, making street corner drives. This work was especially difficult, inasmuch as most of the workers interviewed had already subscribed through their own shops, and the only opportunity the electrical men had was to convince these people that they could afford to purchase one more bond. The average result from this truck daily was $2000.

Every night a truck appropriately decorated and manned by electrical men and a band from the Brooklyn Navy Yard toured the borough, visiting the theaters, motion-picture houses, restaurants, etc., with gratifying results. In addition to these activities, the salesmen made a house-to-house canvass in their respective districts, picking up many a subscription that otherwise might have been lost.

The quota of the Brooklyn committee—$1,000,000—was, as shown by the above results, exceeded by 140%.

GOODWIN PLAN EXPLAINED TO CANADIAN CONTRACTORS.

Mr. Goodwin Explains Details of Plan at Meeting Held in Toronto.

The three-day convention of the executives of the National Association of Contractors and Dealers, which because of the Canadian interest was scheduled to be held in Toronto, Oct. 14, 15 and 16, was postponed. Special permission was obtained, however, to carry out the banquet part of the program and this proved to be one of the best attended electrical meetings ever held in Canada. The delegation from the National Association included W. L. Goodwin, W. Creighton Peet, chairman of the association; J. R. Strong, chairman of the National Constitution Committee, and S. A. Chase of the Westinghouse Electric & Manufacturing Co. Sen. Frederic Nicholls, president and general manager of the Canadian General Electric Co., acted as chairman.

Mr. Goodwin gave a very interesting talk in which he explained the reasons and objects of the association. Mr. Strong then described the constitution and organization in detail. Kenneth A. McIntyre, president of the newly organized Ontario Association of Electrical Contractors and Dealers, explained that this association had followed practically the same plan as the National Association, and in closing tendered to Mr. Peet his association's offer of affiliation.

TRACTION SYSTEM OPERATES DAILY FREIGHT TRAIN.

Illinois Traction System Operates Freight Train to Provide Transportation for Produce.

The Illinois Traction System is now operating a daily freight train between Springfield, Ill., and Carlinville, Ill., to provide transportation especially for groceries and produce which are in such demand by the greatly increased population of Carlinville and vicinity. During the past year the Standard Oil Co. has been engaged on some important mine development in and around Carlinville and four large mines have been opened. These shafts promise, under the management of the Standard Oil Co., steady work and good wages for several thousand miners. As a result the city of Carlinville, as well as adjacent towns, have experienced a boom which is conservative and stable, and the Illinois Traction System is sharing in the greatly increased business of that locality. Excellent freight service is given by this company from St. Louis, Springfield, Peoria, Decatur and Bloomington to Carlinville, and the traction officials report greatly increased freight business in and out of Carlinville.

ANOTHER INDUSTRY GIVEN PRIORITY.

The adding and calculating machine, autographic and credit register, time recorder and tabulating machine industry has been accorded priority by the Priorities Division of the War Industries Board. The value of these machines as labor-saving devices and therefore in relieving the present labor shortage is given as the reason for this action.

After-the-War Reconstruction

Electrification of Belgium and France

WHERE utter devastation exists it is difficult to say that more destruction has been wrought to one thing than to another. Yet the Huns in their devastating methods of carrying on a war of frightfulness and hate have perhaps devoted special effort to making power plants useless than to any other structure less necessary to industry. Recognizing as they have the vital importance power plants play in recuperation to normal conditions and reconstruction, the Huns have spared nothing in the way of power equipment in conquered territory that could be put to use by their enemies when peace came. What they could not carry away they have wrecked.

Before devastated Belgium and France can be placed upon a self-supporting basis, destroyed power houses and wrecked industrial plants must be rebuilt and placed in service. At present hardly a power plant is left standing in the land left behind the retreating Germans. One of the most urgent needs will be for light and power—the wherewithal to carry on intensive reconstruction. Just as life is dependent upon food, so, too, industry in its broad sense is dependent upon ample cheap power.

At least one year, and it is feared in most cases a much longer period, must elapse before coal mines wrecked by the Huns can be placed upon a productive basis. While coal mines are being rehabilitated, power plants will come into existence. But the power plants will be larger and fewer than those that the Huns destroyed. There are already a number of tentative schemes laid out for the erection of efficient plants, many of them large ones, that will tie-in together with one another, enabling large territories to be served by a unified system of transmission and distribution lines. The geographical conditions involved are largely such that the location of power plants as regards coal supply and water favor concentration of large amounts of generating capacity in a few plants. We thus have the unique situation that at least one and a large part of another entire country require the complete design and construction of an electric power generating and distributing system.

The work of reconstructing France and Belgium's power plants will devolve upon Allied supervision; it is to be hoped with German labor and to some extent at German expense. We here, and also Great Britain, have found to our cost the waste and extravagance of independent power plants promiscuously installed and working independently and often competitively. When the time comes, therefore, to rehabilitate the power systems of Belgium and France, the lessons we have learned, and the benefit of our experience in the way of construction, unification and co-operation will be of immense value. Meanwhile, the four things most needed in territories regained are food, clothing, medical attention and electricity.

In rehabilitating and redesigning the electrical systems of Belgium and France so as to utilize coal efficiently and economically and conserve water power, American ways and materials must undoubtedly play a large part. Rapid reconstruction is urgent, which means to very large extent the use of standardized products, installed by Americans with American practice, since our productive capacity stands available. Some of the tales of the springing up of power plants here since the war, in a few weeks plants of thousands of kilowatts have been placed in service, where at the beginning weeds grew on the ground, will be good telling when the war is won. And what we can do here we can also do over there. Fortunately, for a given capacity—for example, 100,000 kilowatts—it is cheaper and quicker to build one plant of four units than two plants of five units each, and thus the erection of "super-plants" tied-in together thus will serve the twofold purpose of eventual economy and immediate convenience.

The area of Belgium is about 11,400 sq. mi., and it is a densely built country. Comparing it with our country, we have, for instance, the area of Illinois, about 56,650 sq. mi., or roughly five times that of Belgium. In Illinois, however, interconnection of electrical supply systems has been carried out quite extensively. In Belgium, therefore, a national interconnected power system is not only feasible but entirely practical.

The change in the power situation in Belgium and France, when these war-stricken countries are rebuilt, will be epochal. The opportunity for the most efficient nationalized electrical generating and distributing systems in existence is embraced here. The work will be of such magnitude that it must be national in character, just as the gains accruing will be national in character. Moreover, the intense sacrifices made by the peoples of these brave lands—sacrifices out of all proportion to those made by America as a nation—will serve to cement a united people and their common interests—cheap electrical power, obtained economically and quickly. But while the electrical systems soon to be in the making will be for Belgium and France, it will be America that will do much of the work, for turbines and condensers, generators and circuit-breakers, transformers and insulators will be needed in large quantities. American genius of bulk production and our ability to produce large quantities quickly must soon be put to work to electrify Belgium and France, brave countries that have so long been covered with a darkness of sorrow and sacrifice.

in the Electrical Industries—III.

In this department the ELECTRICAL REVIEW *will present at frequent intervals items dealing with the after-war reconstruction activities in the electrical industries. Manufacturers, jobbers, central stations, contractor-dealers and all others interested are urged to contribute full particulars of any activities in this direction so that the industry may benefit from an interchange of such comments.*

SURPLUS ELECTRIC POWER AFTER THE WAR.

Suggested Uses for Electric Power in the Industries of Peace and Reconstruction.

BY J. W. BECKMAN.

It may be the case that we will have a surplus of developed electric power after the world has settled down to a normal stride, this power having been developed in this emergency for the supplying of munitions to us and our allies. It is, therefore, important to face this fact now and consider how it may be avoided or overcome.

It would be an economic waste of the very gravest magnitude if this energy available on the busbars should be permitted to be idle, a waste from two points of view—from the point of invested capital in the plant and equipment, as well as perhaps a still graver waste from the point of products that could be produced, thus creating values and giving occupation to labor skilled and otherwise, helping to supply work to the millions of men who will return to us after the war is won.

It is very apparent that many of the industries which are now operating in connection with the war will have to curtail production and equally certain it is that the power which they thus release will not be absorbed readily by any other industry. This certainly will be the case, if we do not as a nation and as individual groups co-operate to extend our foreign markets—i. e., tap new market possibilities.

As a race we are individualistic and it is hard to an extreme to submerge our individuality in co-operative undertakings. We should follow the example of many of the European nations, where through co-operation of many groups of interests a network of commercial houses has grown up covering the world, and through intercommunication between these a true knowledge of the world's commercial demands is obtainable over night, and markets discovered or extended for manufactured materials.

It is, therefore, a question of great import how to increase our commercial activities all over the world. We cannot depend upon U. S. Consular Service to give us material assistance. It works too slowly and in many cases the occupants of the consulates apparently have slight, if any, prior experience making them fitted for the positions they hold. We have to develop them in co-operation, forming new foreign trade combines, or making connections of a most permanent kind with some of the business houses recently formed. The intensive commercial development of new markets is a laborious one, but by this means the electrochemical industries can be kept going and the power developed can be kept working.

Another way of taking care of surplus power in the future is by stipulating new industries—the development of new processes that will take much power and which will produce basic, essential products. This, of course, does not preclude the stimulation of industries already developed, producing products which should have a more general usage.

TWO IMPORTANT FIELDS FOR DEVELOPMENT.

Two industries, both of them basic and both of them producing products essential to mankind, suggest themselves as being suitable life-savers to the electric developments after the war. One is the iron and steel industry and the second is the fertilizer industry. When I refer to the iron and steel industry I do not refer either to the electric shaft furnaces in Sweden nor to the electric steel furnaces distributed all through the country.

I think it is not out of the realm of the possible and I think it is one of the important electrometallurgical developments waiting for a successful solution—the direct manufacture of steel from iron ore. We have already reached forward toward this goal. In the electric shaft furnace pig iron is now produced, known as steel pig iron. The next step will be the finished steel, suitable for the manufacture of the finished steel product in the shape of ingots and castings.

It may be a long step metallurgically to take, but it is one that we should bend all our efforts upon to achieve. If we once accomplish it, we will find the iron industry gradually changing into an electrometallurgical one, consuming enormous amounts of power and stimulating incidentally other industries to activities of very great proportions.

The other industry which would serve to help consume power is the fertilizer industry. The ingredients necessary in a fertilizer which would be most available for improved manufacture would be the nitrogen in some bound form, and the phosphoric acid.

The Government's stupendous work now going on for the production of nitrogen in fixed form, and this work in conjunction with the research work going on for the improving of efficiencies, etc., should bring results, which should foster the nitrogen fixation industry as one of the large potential electrochemical industries that will take care of surplus power at the end of the war. The Government having acquired the right to these, should encourage in all ways the further development of this essential industry, essential in times of peace as well as in war.

The large amount of phosphate rock distributed through many of our states is available as fertilizer only through its treatment with sulphuric acid and even then only a limited amount of the phosphoric acid present is made completely available, or, in other words, only a small per cent of the phosphoric acid is made water soluble by sulphuric acid, while this small per cent is readily reconverted into an insoluble form by the action of ingredients present in the mixed phosphates.

By means of electric power all this phosphoric acid can be made water soluble and in addition the phosphoric acid obtained can be absorbed by various bases

After-the-War Reconstruction

forming salts, which in themselves will form complete fertilizers, such as possibly a double ammonium potassium phosphate, or ammonium phosphates and potassium phosphates. The obtaining of the free acid is readily accomplished by means of the electric current. The details of the operation are simple and apparent.

It may be said that some of the suggestions made above are doubtful as to their practicability. It may seem so at the present time, but with intelligent research and operating extensively in trial plants the technique of the processes will be worked out in such a way that large economies may be effected.

The processes which are suggested herewith as being able to take care of the surplus power deal with basic products—products that are essential to the well-being of mankind and are also in such a way important to the growth of the nation and its well-being.

There are many complex economic questions which arise in this connection—questions that political economists have to be called upon for advice and co-operation. Should industries of this kind be subsidized by the Government, which practically amounts to Government ownership, or should they depend upon private capital and private perseverance to become established? Again, can they exist under such conditions—can they make returns on the capital sufficiently attractive that investors will place their money in them? Again, who will do the necessary research work to develop the processes? Is it not one of those activities that should be done at public expense and the results obtained be available to the public indiscriminately?

The electrochemists and electrometallurgists, who are perhaps better able to look into the future as to the ultimate over-supply of power, should start now for our national well-being a careful study and form a definite policy which should be broadly discussed and finally submitted to our government, making definite recommendations, that we may be fully prepared when our war is up and we return to what will then be normal conditions, to immediately put the surplus power to work along predetermined lines.

NATIONAL CONFERENCE PLANNED TO CONSIDER RECONSTRUCTION PROBLEMS.

Meeting of Representative Industrial Committee To Be Held at Atlantic City.

The plans for the first conference of national importance to discuss the problem of reconstruction are rapidly being completed, according to a recent statement by Henry A. Wheeler, president of the Chamber of Commerce of the United States. This meeting, the War Emergency and Reconstruction Conference of the War Service Committees, is to be held at the Million-Dollar pier, Atlantic City, N. J., Dec. 4, 5 and 6. Approximately 300 industries have chosen and conferred broad powers on their war-service committees, the personnel of which includes the most expert and representative men in the various industries.

The objects of the convention are threefold: First, to keep efficiency and production at the highest possible point through stable labor conditions and steady flow of materials through the plants, thereby maintaining the war program; second, to keep plant organizations together and production from falling off in the face of shortage of materials, labor and transportation; third, jointly to face squarely and constructively the reconstruction period and be ready through accurate and exhaustive study and marshalling of facts to lay before the Government agencies the necessary data and suggestions bearing on this subject.

KEEPING UP OF EXPORT TRADE NOW IMPORTANT.

Although War Work Is More Essential at Present, Manufacturers Should, as Far as Possible, Prepare for Future Trade of This Nature.

Although the Government has repeatedly expressed itself in many ways as being in favor of keeping up our export trade or, if possible increasing it, manufacturers are turning away possible export business every day. Naturally, in these days of demand for war material and lack of transportation facilities, the keeping up of any export business is a very difficult matter. In order to be prepared to undertake the share of the world's export trade which rightfully belongs to us, however, it is necessary that in spite of the many difficulties encountered, we must not lose any opportunity of making friends among foreign trades now.

The old boast that America can live within herself is as true today as ever, but can we do so and still maintain our present industries? Only a small portion of our manufacturers can exist on home trade alone, and this does not include the large number of newly erected plants now engaged in war work. To keep these new factories going as well as the older ones, we must plan on a larger export trade of manufactured goods after the war than we had before. This portion of our exports before the war amounted to only about 20% of the total, the balance being in raw material, much of which was manufactured and then exported by other countries.

The war has put our manufacturers in an enviable position as far as exporting is concerned. At present we have much more trade than we can be expected to handle, but we cannot afford to treat it carelessly. Peace is bound to come and with it will come competition from the former exporters of other nations. Then, also, our import demand will increase, for we do need many articles which must be imported. To turn away export business now, without making a sincere effort to keep it, will make it just that much harder to compete with other nations in the future. Electrical manufacturers, then, should try to at least keep up as much of an export trade as they possibly can without neglecting any of the essential government work.

Attention is now being given the matter of electric traction of vessels along French canals, in this way speeding up freight movement and increasing the capacity of the waterways. The methods under discussion are the use of tractors and the use of a chain laid along the bed of the canal and hauling on it a motor-driven drum on the scow or barge.

Commercial

Suggestions for Central-Station Advertising to Promote Conservation — Cooking Exhibit of Wisconsin Company

ELECTRIC IRRIGATION PUMPING PROVES PROFITABLE ON LARGE SCALE.

Value of 23,000-Acre Tract Increased Five-fold and Over $4,000,000 Products Raised.

An electric pumping installation, completed about June 1, at Sidd's Landing on the Sacramento river, in California, made practicable the irrigation of 23,000 acres of rice land during the past season, the value of the product this year being estimated at $4,300,000. The project is that of the Provident Irrigation District, which spent $750,000 on its pumping plant and system of irrigating canals. This body of land, formerly considered worth $30 per acre, is now valued at $150 per acre.

The pumping equipment consists of four General Electric 500-hp., 2200-volt motors, direct-connected by flexible couplings to four Byron Jackson 42-in. horizontally split, double-suction pumps of a combined capacity of 220,000 g.p.m., against a head of 30 ft. Electric energy is supplied by the Northern California Power Co. The power required in pumping water for the tract of 23,000 acres cost about $35,000 for the irrigating season of five months.

SUGGESTIONS FOR CENTRAL-STATION ADVERTISING WHICH PROMOTE CONSERVATION.

Society for Electrical Development Prepares Cards to Meet Latest Government Request.

The Government in classifying central-station companies as essential and co-operating with them through the Fuel Administration in securing the requisite amount of fuel expects that these companies in return give every possible aid in the husbanding of the fuel which is so badly needed at this time. So far, two methods by which the central station may aid in the fuel conservation have appeared. The first is that the use of electricity be recommended whenever possible, especially in the war industries. The fulfillment of this obligation by the central-station companies is only good business, for they in return receive a substantial financial income from it.

The second and principal effort in this respect is that the companies encourage conservation through the judicious application of electric service. Although this request cannot be used to such good advantage to the central station as the other, so far each individual government request has been fully complied with.

One of the most recent requests in this latter effort was that the use of inefficient lamps be discontinued. The advantages to be derived by this means are apparent. Another and more recent request is that all central-station companies, through their advertisements, promotion literature, etc., impress upon the public generally the urgent importance of avoiding wasteful and extravagant use of gas and electricity.

The Society for Electrical Development, Inc., of New York City, co-operating with the central stations and the Government in response to this latest request from the National Committee on Gas and Electric Service has prepared a set of twelve advertising suggestions for use of these companies in furthering conservation by means of the proper use of electricity. These suggestions, one copy of which is reproduced, are the result of careful and painstaking effort on the part of the society. The importance of conservation and the means by which it can be accomplished by the

A Message to Housewives—No. 2

Coal is vitally necessary to the winning of the war. Electrical Energy is also necessary for the same reason. Coal is the prime requisite in making Electricity. Therefore, wherever and whenever you conserve Electrical Energy you are saving valuable Coal.

Perhaps you have failed to realize just how vital it is that we all help to conserve coal. This is what must be done if the coal now in sight and available is to be made to last until Spring.

A saving of 2½ lbs. of coal for every man, woman and child in the United States must be effected *each day until Spring.* Otherwise one of two things must happen:

First, essential industries will lack just that amount of coal that will have to be diverted to domestic needs to offset the amount needlessly wasted. Or:

Second, households will have to go without in order to keep war industries going full blast. And it's vital to our success at arms that *essential industries* have enough coal to insure their uninterrupted operation.

A lamp left burning when its light is not actually needed means just that much COAL wasted.

The use of old style carbon lamps wastes 66⅔% of your light—therefore every one of these carbon lamps in your lamp-sockets is wasting 66⅔% *fuel* that could be saved by using modern, efficient tungsten lamps.

The use of an Electrical appliance will save fuel, food, time and labor over old methods of housekeeping but to permit any Electrical appliance to consume current for a moment longer than is necessary for its operation is wasteful.

Be the first to set a good example. Use as much light as you actually need. Don't waste it. Use Electrical Energy in the house wherever you can *save* food, time and labor—by doing it Electrically—but don't waste this vitally valuable Electricity.

Consult your Central Station. They will help you gladly and tell you just what size lamps to use.

(Name of Your Company Here)

(In ordering Illustration refer to Announcement D)

Central-Station Advertisement Which Promotes Conservation.

use of electricity are very clearly explained. At the same time, the place which the central-station company occupies in the field of war activities, its work in this field, and the fact that, in spite of the greatly increased prices of labor, fuel and materials, in many cases the price of service has remained the same and in no case has it been increased in proportion to these increased costs are also brought out.

As these cards or suggestions were meant for use by the many different central-station companies, suitable space is left in them for the name, address and telephone number of the company. Mats of the cuts for each advertisement may be obtained for 5 cents each from the society. The use of these advertisements by central-station companies is earnestly recommended, not only on account of their value as a means of promoting conservation, but also for the very fine advertising qualities which they possess.

CENTRAL-STATION EXHIBIT AT COUNTY FAIR.

Wisconsin Light, Heat & Power Co. Displays Ranges and Cooking Appliances.

Although there has been considerable curtailment in solicitations for new business on the part of central stations, the war has emphasized the economy and value of electrical appliances for the home, particularly with regard to savings in labor, fuel and food. Much impetus has therefore been given range and appliance sales. In those communities where it has been impossible to actually make installations, the utility com-

Cooking Exhibit of Wisconsin Light, Heat & Power Co.

panies have nevertheless continued without abatement their educational activities, thus preparing for the time when the situation will permit of taking on such business.

The accompanying illustration shows an attractive educational exhibit of the Wisconsin Light, Heat & Power Co. at the County Fair at Beaver Dam, Wis. The space was devoted very largely to a display of Hughes electric ranges and ovens and daily demonstrations were conducted. The exhibit attracted considerable attention and the officials of the company believe that the results of the work accomplished will be felt for some time to come.

PORTLAND COMPANY TO SERVE NEW STEEL MILL.

The Portland Railway, Light & Power Co., Portland, Ore., has arranged to supply electric power for the new plant of Pacific Coast Steel Co., under construction at Wilbridge, in the vicinity of Portland. In anticipation of a power load of about 1500 kw. at those works, the former company has purchased of the General Electric Co. the necessary transformers, consisting of two of 500 kv.-a., 3-phase; three of 150 kv.-a., single phase, and two of 50 kv.-a. for lighting. Energy will be received at 11,000 volts, to be stepped down to 2300 by the 500-kv.-a. apparatus, to 440 by the 150-kv.-a., and to 110/220 by the lighting transformers. There will be a connected load of about 1000 hp. in 2300-volt motors, 550 hp. in motors of 440 volts, and the lighting load will amount to 100 kw. The installation will include a 150-kw. motor-generator set for producing direct current energy for cranes and hoists. The largest motor required will be one of 800 hp. for operating the rolling mill.

DEPARTMENT STORE METHODS WOULD HELP CENTRAL-STATION SALES.

Idle Stocks Represent a Loss That Can Easily Be Eliminated.

There is no doubt but that the adoption of department-store methods by central-station and other companies selling electrical appliances would result in an increase in sales in these appliances. The average central-station man is a much better engineer than a salesman as a rule and is too often far behind in his business methods. No better proof of this can be had than a view of the large amount of stationary stock that is usually to be found in the warehouses and stockrooms of the average electrical salesroom. Very often this stock has at one time or another been displayed in the show windows for a time and then put away on the shelves without any real attempt being made to sell it. After lying on the shelves for a few years it is sold for junk and newer designs take their place, to follow in the same path. Of course, they don't all go as junk but nevertheless too many do.

In any case this stock represents a loss in capital invested that should be eliminated. When the average department store finds itself with a certain amount of stock that is apparently all right but still is not moving or selling, it usually announces a sale and gets as much as possible out of it in order to re-invest the money in better and newer stock. The technical man, however, seems to think it beneath him to have a sale, even when convinced it is the only method of getting a return.

Of course, he should not try and force a lot of worthless goods upon the public and thereby lose his reputation. The usual trouble with such stocks, however, is that they either are not given sufficient advertising or that the price is too high. In these cases a well-advertised sale at a reduced price would certainly help to keep them moving. This would result in many sales departments showing a real profit at the end of the year instead of a loss or having to make the consumption of the appliances sold make up the bulk of the profit.

NEW POWER CONTRACTS FOR MINNEAPOLIS CENTRAL-STATION COMPANY.

The sales department of the Minneapolis General Electric Co. during the week ended Oct. 26 accepted contracts with 331 new electric light and power customers with 186 kw. of lighting and 706 kw. in motors. This includes contract with the Y. M. C. A. for 360 hp. to take care of its new building; also contract with the Illinois Steel Warehouse Co. for 250 hp., and an additional 53 hp. for the Dunwoody Institute (devoted to military training). New business connected to the company's lines includes 101 customers with 106 kw. of lighting and 107 hp. in motors. Output of electric energy was 10 per cent greater than during the corresponding week last year.

PAPER PRODUCTS CO. ELECTRIFIES PLANT.

The National Paper Products Co., Stockton, Cal., has about completed a manufacturing plant which is equipped for electric drive throughout. This required 40 alternating-current motors, amounting to 2000 hp., and three 500-kv.-a. transformers. All electrical equipment was furnished by the General Electric Co., power by the Western States Gas & Electric Co.

Operating

Conserving Boilers—Protecting Cables in Manholes—Helping Illinois Power Plants — Transformer Hoisting Device

PLAN FOR CONSERVING BOILERS.

Innovation by Empire Gas & Fuel Co. for Making Over Worn-Out Boilers.

For the conservation of worn-out boilers, the Empire Gas & Fuel Co. will shortly start the erection of a complete boiler plant at Oil Hill, Kans. It will be another measure of conservation which has always been the motto of the companies operated by Henry L. Doherty & Co. It is planned to rebuild every boiler at a minimum cost, and it is anticipated that not a single new one will have to be bought for several months.

The shop building itself will be thirty by ninety-four feet and will be located directly south of the larger, modern machine shop. It will have every modern mechanical device that is used in any of the large shops of the country. Cranes will be used in lifting the boilers from one portion of the shop to another, power punches, air compressors and every device that is necessary for an up-to-date shop will be installed.

The corrosive effect of water has been especially bad in Butler county and it has been necessary to install new tubes in boilers after a comparatively short time. The new shop will have devices to re-weld the tubes and save the purchase of new ones.

The welding apparatus will be an electric one, as it has been found that the oxy-acetylene process is not practicable for use on boilers as it renders the iron too hard and cracking results.

PROTECTING CABLES IN MANHOLES.

Advantages of Fiber Conduit Are Pointed Out.

By A. L. Fisher.

That the sheaths of cables in manholes require protection from damage from any one of numerous causes is so well known and practiced as to be a fact hardly worth mentioning. While every company operating underground systems, and uses therefore in all probability, manholes, all companies are not agreed as to the best manner of protecting the sheaths of cables in the manholes.

Before determining upon the most suitable mode of protecting a cable sheath, and the most suitable is that which accomplishes the most advantages with the fewest disadvantages, it is well to discuss the varied factors the protector may be called upon to protect the sheath against. A cable sheath may be damaged by heat from the burning of an adjacent cable or rush of current from sheath to earth or adjacent cable sheaths; it may be damaged by men using the cable as a step for entering or leaving the manhole; by rough usage while material and men are moving about the manhole. A protective covering for a cable sheath should therefore be mechanically strong, sufficiently strong to be able to withstand rough usage, and it should be fireproof and heat-resisting.

Of the materials most used for protecting cables in manholes, perhaps the favorites are cement coverings and asbestos. The former is usually plastered upon a rope wound spirally around the sheath; the latter applied to the sheath in the form of cloth, which is then wrapped on with steel tape. To take up these two forms. The cement covering requires that the men doing underground cable work must be supplied with cement and sand, used usually in the proportion of about one to one. They must also be furnished with rope and with tools and facilities for mixing the sand and cement. For the asbestos covering is required asbestos cloth and a place to keep it from moisture and damage; and steel tape. Asbestos cloth is easily damaged and must be transported and handled carefully; its cost is high and its life rather short.

As being preferable to either cement or asbestos with steel armor, the writer advocates the use of bituminous fiber duct as a covering for cables in manholes. There are many reasons for this. Fiber conduit, or duct, does not cause corrosion of lead in the presence of any underground moisture or gases with or without the presence of electrolysis, as may both cement and asbestos; in fact the benefits of tar paper often used with the cement covering to prevent corrosion is met when bituminous fiber duct is used with the advantage that it acts as a protection against mechanical injury at the same time. By having the fiber ducts cut to standard or convenient lengths, and at the same time cut lengthwise, it is a simple matter to slip them into place in the manhole without loss of time, without need for careful handling as is the case with asbestos, or mixing as is the case with cement.

Some cities use cement ducts, sections of which are molded in halves for slipping on the cable in manholes. However, fiber is far superior to cement because the latter is very brittle and the breakage rate is high; moreover, whereas, fiber duct can be shipped without breakage with far lower freight charges, because of its lightness, cement duct is extremely heavy, and very brittle, resulting in high freight charges and heavy loss due breakage.

A covering for cables should permit of installation and removal with ease and minimum loss of time; it should be of low cost, long life and capable of accomplishing its purpose. The writer believes on any one of these bases fiber will be found preferable to any other method of protecting cable sheaths in manholes from the influences that may exist in the average manhole.

HELPING ILLINOIS POWER PLANTS SAVE COAL.

Weekly Letters Being Sent Out by Administrative Engineer.

To every power plant in the State of Illinois, Joseph Harrington, administrative engineer, United States Fuel Administration, is sending out letters on

the handling and use of coal. These letters aim to arrive about every seven days.

Each weekly letter takes up some subject, and each power plant is asked to study this subject on receipt of the letter. In this way the entire survey of a plant is expected to be very much more complete than were a general survey of many details carried on simultaneously. The first general letter issued by Mr. Harrington explains itself, and is as follows:

TO ALL FACTORY COMMITTEE CHAIRMEN IN THE STATE OF ILLINOIS:

"In order to bring to your attention the matters which must be looked after in the improvement of your plant efficiency, I shall send you, through your district chairman, a series of letters on various interesting topics.

"When you get these letters, please carefully read and preserve them and immediately study your plant with the object of finding out just how you stand in reference to the subject of the letter.

"The week set aside for each subject, should be devoted to a very careful examination of your plant in reference thereto, and you should take immediate steps to improve the conditions if improvement is possible.

"Attention to the matter of plant improvement will not only increase your efficiency and save you the coal that you are now wasting, but will reduce the total fuel required for the State of Illinois and permit of active prosecution of our war activities."

The second letter distributed deals with coal storage, and is as follows:

QUESTIONNAIRE ON COAL STORAGE.

Please answer the following questions and mail your answers direct and as soon as possible to Professor H. H. Stoek, Department of Mining Engineering, University of Illinois, Urbana, Illinois.

1. What kind of coal was stored:.....
2. What size of coal was stored:.....
3. What amount of coal was stored:.....
4. State from what mining district and if possible from what mine the coal came:.....
5. The size of pile: Depth....; Length....; Breadth....
6. Describe the method of storing:.....
7. Have you had any difficulty from fires in your coal pile:.....
8. How much, if any, of the coal was destroyed by this fire:.....
9. What in your opinion was the cause of the fire:.....
10. What evidence have you upon which to base this opinion:.....
11. How long had the coal been in storage when the fire was observed.....
12. Was the coal actually ablaze or only smoking:.....
13. Whereabouts in the pile did the fire start:.....
14. How was the fire controlled or extinguished:.....
15. Was any attempt made to ventilate the pile; if so, how.....
16. Was there any damage to adjacent structures?.....

Further mention of these coal-conserving letters will be made from time to time as letters are sent out.

TRANSFORMER HOISTING DEVICE.

The distributing transformer is one of the most reliable pieces of electrical apparatus connected to the system. Once installed, it usually remains in service for years without any trouble whatsoever, notwithstanding overloads, unfavorable climatic conditions and general abuse. It has thus become the custom to wait until trouble occurs, such as burnouts, rather than to install reserve transformer capacity, except in special cases.

However, when a distributing transformer does go out of service because defective, which usually happens during the load period, it is important to be able to replace the defective unit with minimum loss of time. This can be better appreciated in the case of a transformer supplying lighting that burns out during the evening peak, or one transformer of an open-delta bank supplying an important three-phase power load. Under these circumstances the methods employed for removing the defective transformer and replacing it by another should be rapid, simple and safe.

The accompanying illustration shows a 30-kw., 22,000-volt, 3-phase transformer being hoisted into

Tool for Raising Distributing Transformers Safely and Quickly.

place. The weight of this transformer is about 1500 lb. The method of hoisting is simple in the extreme, permits of rapid work and is safe as regards the workers and the transformer. The method consists of anchoring a swinging boom on the crossarm at the free end of which is fastened a block and tackle, which in turn is fastened to the pole. The location at which the transformer will come into place depends upon the position in which the swinging beam is anchored at its base. For example, to install two small transformers, one each side of the pole but on the same crossarm, all that it would be necessary to do would be to change the position of the base of the hoist arm from the one side of the pole to a corresponding distance from the pole on the other side of the pole on the same crossarm.

In placing the transformer, one man usually works on the pole, guiding the transformer into its proper location and hanging it, while the man or men on the ground, depending upon the weight of the transformer, raise or lower as is necessary.

MAKING BAD OIL BETTER.

A cheap oil mixed with deflocculated graphite will do the work of a high-grade lubricating oil for the same purpose. Scarcity of oils, delayed deliveries, and so forth, makes it worth while to remember this, since to do so may save much trouble, annoyance and delay in emergency.

Contracting-Construction

Stenciling Contractor's Name on Cabinet Covers—Supporting Crane Trolley Wires—Several Conduit Wiring Kinks

USING CABINET COVERS AS ADVERTISING SPACE.

Electrical Contractors Inclined to Underestimate This Method of Identifying Their Work.

By Edward O'Brien.

The large manufacturers of electrical as well as other goods go to a great deal of expense and trouble to label their goods with their name or trademark and this is regarded by them as an important asset. Many jobbers, mail-order houses, department stores and even smaller merchants also place a high value on their trademarks and often go to extremes to give them proper publicity and place them upon articles that they sell.

In nearly all large wiring installations the panel or switchboards bear in some way the name of the electrical contractor who installed them. The majority of contractors, however, even though they themselves when buying always give preference to articles which bear the maker's trademark, do not avail themselves of the publicity that is to be gained by stenciling the switch or cutout cabinets or otherwise marking the wiring installations which they install.

Even when this is called to their attention many still refuse to appreciate its value. True, in all probability it will not be seen by as many people as a billboard, but the people who do see it are more apt to be interested in it. Neither does it cost as much as a billboard, the best means being in this case the cheapest, i. e., to stencil the name and address in as large letters as is possible on the cabinet. This only requires a very small amount of paint and a stencil. The latter can be secured for little or nothing from any shipping firm having a stenciling machine.

In a large majority of cases the name and address of the original electrical contractor is not known or cannot be found when any additional work is to be done. This is particularly true in the case of houses, apartment and office buildings and stores that are built in new divisions by real-estate men and then sold. When any changes or alterations are to be made the original contractor is usually looked upon as the logical man to do the work, as he probably knows the conditions of the original wiring better than anyone else and can therefore do the work quicker and easier than a stranger could. However, unless he can easily be located, the work usually is given to someone else.

I recall one instance of this sort which would certainly have more than paid the original contractor enough to label all his jobs for five years to come. An apartment building changed hands and the new owner, hoping to increase the value of the apartments, was doing considerable additional work, such as installing new circuits, baseboard outlets, switches, etc. He was very anxious to have the original contractor do this work but, after a search of the premises and considerable inquiry failed to reveal who he was, he had to be content to give the job to another firm. Had the original contractor spent about 1 cent for paint and two minutes to put it on a cabinet he might have been handed a contract which totaled nearly $600. This is but one of many cases that are happening every day.

The chance for additional work is not the only benefit to be derived from this form of publicity. The knowledge of electrical firms possessed by a large majority of people comprises the name of the place where they pay their monthly bills and sometimes the name of the central-station company. However, unless they are acquainted socially, they seldom, if ever, know the name or address of any contractor. If, however, they are informed every time they go into the basement that such-and-such a firm wired this particular building, they will remember it when they or any of their friends are having any wiring done.

As was stated, the best form is also the cheapest. Many firms go to a considerable expense to equip their cabinets, etc., with engraved plates. These, although much better than nothing at all, are not as good as a simple stencil painting which can be seen and read from a considerable distance.

A SIMPLE SUPPORT FOR CRANE CONTACT WIRES.

By George F. Miles.

A great many different arrangements, more or less complicated, have been proposed to support the contact wires which are installed along the runway for supplying the current to traveling electric cranes. These wires are usually supported along the side of the runway a foot or two below the crane rail, and are so located that the collector shoes or hooks mounted

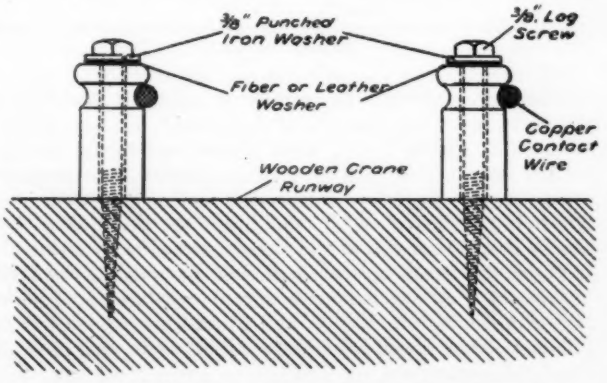


Fig. 1.—Arrangement of Crane Trolley-Wire Supporting Insulators.

on the crane engage with the wires and thereby convey the electricity to the crane motors.

At each end of each contact wire a strain insulator is provided. Into the loop at one end of the strain insulator the contact wire is made up. The loop at

the other end of the strain insulator is bolted into the clevis of a turnbuckle or of a tightening bolt by means of which the tension in the contact wire can be adjusted. Such devices at the ends of the contact wires are called the termination supports. At points possibly 12 or 20 ft. apart along the crane runway, intermediate supports should be provided to prevent the contact wires from sagging excessively. Figs. 1 and 2 show how such intermediate supports can be very simply and cheaply arranged.

Fig. 1 is a cross section that shows a support of the type to be described. To insulate and carry the copper contact wires, porcelain insulators of the dimensions in Fig. 2 are used. While insulators of these dimensions are not always carried in stock by the smaller electrical supply houses, they are regularly manufactured and can be readily procured. Where the runway is of wood, as shown in Fig. 1, each insulator is held thereto with a ⅜-in. lag screw which should be at least 6 in. long. Before the lag screw is turned into the wooden runway, a hole should be bored with a 3/16-in. bit for its reception. Between the head of the lag screw and the top of the insulator, a leather or a fiber washer should be placed to prevent cracking of the porcelain; and a ⅜-in. punched iron washer should be used just under the head of the screw to prevent the corners of its square top from digging into the soft leather or fiber washer.

Where the runway is of steel, machine screws can be used instead of lag screws for supporting the insulators. Ordinarily the web of the runway girder

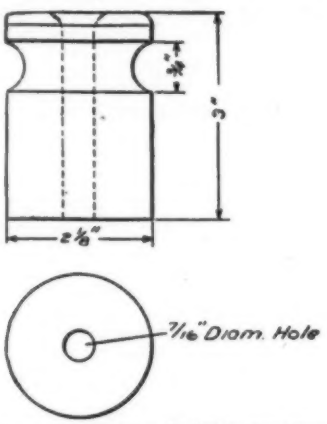


Fig. 2.—Dimensions of Insulator Suitable for Supporting Crane Trolley Wires.

will be thick enough to provide a sufficient number of threads for a substantial attachment. If the web is not thick enough, the intermediate supports can be either located at stiffener plates where an adequate thickness of metal is available, or the insulators can be held to the web with machine bolts, the nuts of the bolts being located on the unexposed side of the web. Where the insulators are attached directly to the steel plate, as just described, a set of washers should be used, as shown in Fig. 1, and in addition, a leather or fiber washer should be inserted between the base of each insulator and the steel.

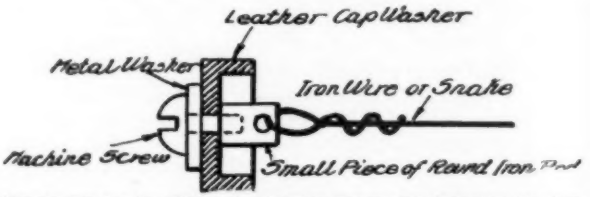
If the porcelain insulators clamped directly against the face of the crane runway, as shown in Fig. 1, do not locate the contact wires in the correct position (the contact-wire locations are usually specified by the crane manufacturers and are shown on the construction drawings sent out by them) spacing blocks of wood or metal, or a yoke forged from bar iron can be inserted between the bases of the insulators and the runway girder to increase the distance between the contact wire and the face of the girder. The normal position of the contact wire is, as shown in Fig. 1, in the groove of the insulator.

REMOVING WATER FROM CONDUIT.

By J. A. Wever.

After several jobs of clearing trouble on conduit installations, in which the trouble was caused by water collecting in the conduit from condensation, the device shown herewith was developed for the purpose of removing the water and drying the conduit before pulling in the new wires. It can be quickly and easily made and will be found quite effective.

The device is pulled through the conduit from the outlet at the highest point of the run and forces all



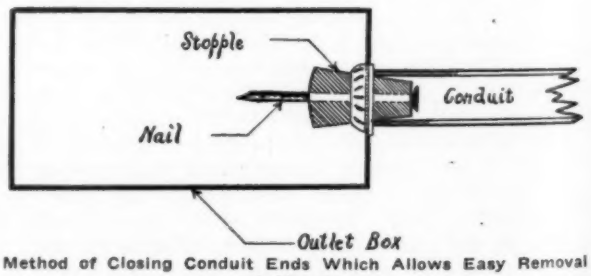
Simple Device for Removing Water From and Cleaning Conduit.

water before it and out of the other outlets. It should be run through several times, and then the leather washer should be removed and a number of cloth disks substituted before the final pull so as to wipe the walls of conduit clean and dry. So as to save the trouble of refishing after each time this cleaner is pulled through, it is well to fasten a pulling-in line between the washer and machine screw at the end. This will permit drawing the snake and the attached device through quickly.

PLUGGING CONDUIT ENDS IN CONCRETE BUILDINGS.

By Arthur S. Nickerson.

When installing conduit in concrete forms, as is often done in a new building, stopples must be used to plug the ends of the conduit. This is done to prevent the concrete from filling up the conduit when it is poured. These stopples are usually driven in tightly and considerable difficulty is experienced in removing them. The writer has found it convenient to drive a



Method of Closing Conduit Ends Which Allows Easy Removal of Stopples.

small nail, preferably one with a large head, into the small end of the stopple before it is installed. When the stopple is to be removed the nail can be gripped with pliers which furnishes sufficient leverage to make this removal easy. A small piece of conduit, long enough to cover that part of the nail which protrudes from the stopple, can be used, when the stopple is being driven in, to keep from driving the nail out.

Contractor-Dealer

Washing Machines Particularly Useful Now—Investment Problems of the Dealer — Electric Fans as Fuel-Savers

ADOPTION OF WASHING MACHINES NOW PARTICULARLY DESIRABLE.

Servant Problem and Insanitary Condition of Many Laundries Should Further Use of Labor-Saving Devices—Opportunity for Contract-Dealer.

The use of modern labor-saving apparatus is so general in stores, offices and factories, that only its absence is noticed nowadays. Its adoption has not only permitted decreasing the hours of labor, but at the same time increased production. There is scarcely a man, no matter what his position may be, who is not made to realize almost daily, through personal experience, the advantages of modern equipment and who does not know the place the use of machinery has in modern development. This is particularly true of the farmer whose farming machinery enables him to greatly increase production with much less labor.

The use of modern labor-saving devices in the home, however, especially among the farmers, is not making the rapid progress that it should. This is particularly true in the case of power-driven washing machines. The American Washing Machine Manufacturers Association recently published a booklet for distribution among the trade in which the advantages of the use of this kind of apparatus are very fully brought out. This information is especially useful at this time. The farmer's wife must meet the demands made upon her by the increased production of the farm with scarcely any additional help, and it is certain that the burden of washing is heavier for her than upon the city wife. She has none or few of the conveniences, such as running water, stationary tubs, gas heaters, etc., and even the doubtful help of the steam or wet-wash laundry is denied her. However, there is some kind of power washing machine which can be used on almost any farm and if the wife is expected to keep up with the increased production demanded of the farmer this help should be given her.

In the city, also, the adoption of the power-driven washing machine should be particularly urged at this time. The demand for female help has caused a scarcity of servants so that more women than ever are doing their own housework. This has, of course, resulted in the use of many electric and other kinds of power washing machines but in many cases the clothes that were washed at home by servants are now sent out to public laundries. Wherever possible the use of a power-driven washing machine should be urged in preference to having the wash sent out. In addition to wearing the clothes out much sooner than when washed at home the public laundry has often been found very insanitary. The results of the recent investigation by the New York City Department of Health show that not only in the small hand laundry and in Chinese laundries, but also in many of the larger steam and wet-wash laundries the conditions are very insanitary and the methods used tend to promote this condition.

There is no doubt but that the purchase of a modern electric washer would in many cases enable the housewife to do the washing at home. Furthermore, under the liberal payment plans of most washing-machine companies, the present weekly laundry bill would soon pay for the washer without laying out any big purchase sum at any one time.

The booklet shows that an electric washer, or if electricity is not available, some other power-driven or even hand-operated washing machine, is very much to be preferred to sending the work out to the home of a laundress, to a Chinese, hand, steam or wet-wash laundry. At home the washing can in this way be done with little labor and in a perfectly sanitary way, always under supervision and with utmost care. The booklet, which is appropriately entitled "Who Washes Your Clothes?" will be found of great value by electrical dealers in presenting the facts pithily to the prospective purchasers of washing machines. Although issued by the American Washing Manufacturers' Association, it is arranged so that each individual manufacturer can place his imprint, with cut of his machine and brief statement of its special features, on the last page, so that the arguments presented will not only create the desire for a machine, but the cut of the one shown will suggest the one to be bought.

PROBLEMS OF THE DEALER CAUSED BY THE HIGH PRICES OF MERCHANDISE.

Reducing Capital Investment by Concentrating Stocks in a Few Standard Brands, Enables Contractor-Dealer to Decrease Operating Costs.

By H. H. Gould.

As a result of the high war-time prices, dealers in all lines are finding that it is requiring considerably more capital to maintain their stocks. Besides the fact that this additional capital must be supplied in large part from the profits already made on previous sales, this has the additional effect of increasing the dealer's cost of doing business, and hence results either in smaller net profits to the dealer or higher prices to the consumer. A greater amount of capital requires that larger amounts be charged off for interest, for taxes, and for insurance.

One of the problems thus confronting the dealer is how to keep down his capital investment in face of rising prices. One answer to this problem is to concentrate the investment on as few brands in any line as possible. Instead of stocking every brand called for and having six or eight or ten different brands on the shelves, let the dealer through a careful study of the merchandise and the demands and needs of his trade determine the one or two or three brands which are really the best ones for his purpose and then limit his investment to these. Almost every dealer, if he analyzes his stock carefully, will readily discover such one or two or three brands in any line which are the

easy sellers and quick movers, and upon which he is doing the bulk of his business in this line.

For example, in checking over the stock of a large grocer in a certain city, the writer discovered that he had fifteen different brands of baking powders and over twenty brands of washing powders and cleansers on his shelves. When this dealer's attention was called to the matter, he was surprised. He had not realized that he had so many different brands, and readily admitted that he was doing the bulk of his business on about four brands of each. These were brands well known to the public, of course. These were the only brands which were really moving and making him a profit. He could easily eliminate all the others, and concentrate the investment on these four standard, quick-moving brands without loss of customers, for all classes of trade readily accept standard merchandise.

Such a step would result in his freeing for other use over two-thirds of the money he had tied up in these lines, besides making for even faster turnovers of the standard brands, and on his total capital.

The same principle applies equally well to hosiery, underwear, sleepingwear, shirts, corsets, toilet articles —in fact, to practically every line of merchandise.

The principle of concentration of investment upon the minimum number of standard brands in any line is sound principle of merchandising under any conditions, but is especially significant in these times of high and rising prices when the demands upon the dealer's capital are so urgent.

Clearly, it is unfair to the quick-moving standard brands to require them to show the profit for the entire line, when over two-thirds of the total money invested in the line is tied up in slow-moving, non-standard brands. If dealers will keep records such as will enable them to calculate the actual profits made from each item of their stock, instead of calculating theoretical profits on the basis of margin, they will find that the standard brands are really their profit-makers. This will result in less criticism of the profits derived from sales of the standard brands and in less confusion of "profits" with "margin."

Too many dealers make price the primary consideration in buying, not stopping to realize that merchandise, no matter how cheaply it is bought, has absolutely no value to them until it is sold. In fact, it is a liability and expense as long as it remains on the shelves. For, it is subject to interest, tax, insurance and depreciation charges until it is sold.

Let the dealer make sure that his capital is so invested that it is working for him—that it is invested only in goods which will move quickly. This is especially important right now, for the day is surely coming when prices will start on the downward trend and only those dealers will avoid serious losses whose capital is invested in known brands and who are able to dispose of their stocks readily.

Let the dealer protect himself against losses by concentrating on standard merchandise!

THOSE WHO PASS AND THOSE WHO PAUSE.

By Sidney Neu.

If there is any doubt in your mind as to whether it pays to spend a little time in making your windows attractive, try this test yourself.

Station someone outside your window with instructions to count the people who pass your store, and those who pause in front of your window. Then change the trim, making a special effort to produce an interesting display, and try the same plan.

Unless your experience is an exception, you'll find that the well planned, carefully trimmed window will attract a considerably higher percentage than the window jumbled together in a hurry some Monday morning. Care and thought in window trimming always pay. You may learn some things about color and motion and arrangement from this single test that will help you in every window you trim.

But remember this when you look over the tally sheet of people who pass and people who pause: The figures are only an indication of the value of a trim as an effective sales factor.

Two windows, for example, might draw equal crowds, yet one would merely satisfy idle curiosity while the other would actually sell goods. The important thing to remember is to put sales interest into the trim. Show, if possible, how the fan, percolator, toaster stove, or sew motor will benefit the user. The nearer you can bring your message home to the passer-by the more effective is the trim.

Don't forget that the window space is the most valuable part of your store. Make the most of it. Change your trims often. Keep up with the times. Try to have the most attractive window, not only on your street, but in your whole city. Don't think for a minute that your chance is limited by the size of your window, for it isn't true. Small windows frequently are better trimmed than those which can show a half block of plate glass. The effectiveness of your window depends solely upon the plan and its execution—and both depend on you.

FUEL SAVINGS ACCOMPLISHED BY ELECTRIC FANS.

The electric fan is generally thought of only in respect to the cooling breeze which it produces in hot weather. This is, of course, their primary purpose and were it not for these cooling properties they would probably not be on the market today. It is a fact, however, that they can be used to good advantage as fuel-savers. The possibilities of the further use of fans in this way is fully brought out in a recent issue of the *Sales Bulletin* of the Public Service Co. of Northern Illinois.

It is a well-known fact that the heating of any room is done by the circulation of the air rather than heat conductance by the air. This circulation of air is very slow unless hastened by some artificial means. It often happens therefore that the part of the room nearest the heat becomes unbearably hot before the more remote parts are warm. This means that a considerable quantity of fuel is wasted in trying to heat these remote corners. In addition to the fuel which is wasted in this way there is considerable lost by keeping rooms warm when not in use on account of the time which is required to heat them.

By directing the breeze from an electric fan on the source of heat, however, the circulation of the air is greatly increased. The freshly heated air is hurried to the cold corners of the room, and a movement of air is established which quickly heats the room. This usually takes from 10 to 15 minutes.

That electric fans in this way can be used to effect a fuel-saving has been definitely established and the proper presentation of the idea may enable the dealer to dispose of his remaining stock of fans and also promote fuel conservation.

New Appliances

Meter Adapter—Novel Pull Socket—Three-Wire Meter—Furnace Operating and Control Equipment—Marine Switch

NEW METER FITTING PERMITS CONNECTING FROM EITHER SIDE.

Considerable difficulty has been experienced by central-station companies and others in the identification of meters in apartment and office buildings. After the meters have been in service for a short time, tags, etc., which are usually attached to them, become lost or illegible, leaving only the meter number as identification. This number, while it serves to identify the meter to the different departments of the company, cannot be used by contractors, customers, inspectors, etc., who do not have the necessary records.

New Appleton Meter Adapter Which Permits Connecting From Either Side.

The new meter adapter recently put out by the Appleton Electric Co., of Chicago, provides a card holder on the face plate which will hold a card 3¾ by 2¼ in. On this card can be placed the necessary data which will enable anyone to tell which meter measures the consumption of any part of the building and also the customer's name. By placing the sealing lug of the adapter at the open end of the card holder this card cannot be removed without breaking the seal.

Another feature of this adapter is that it is designed for either right or left side connections. This is done by providing both the top and bottom of the fitting with openings and arranging the porcelain connection block so that it can be made to face either way. For instance, by taking the connection block from the position, as shown in the accompanying illustration, and replacing it so that it faces what is now the bottom of the fitting, it is changed to a top-connected left-side fitting. A removable plate is provided for closing the unused end. This feature will enable contractors to carry a smaller stock of fittings, which is especially desirable at this time.

THE LEVOLIER—A NEW PRINCIPLE IN PULL SOCKETS.

With the general use in households of electric flatirons and other heating devices and appliances of similar high wattage, it has become necessary to develop a 660-watt, 250-volt pull socket, since the ordinary pull socket has a rating of only 250 watts, 250 volts, and soon breaks down when used on 600-watt appliances. In spite of this many such pull sockets are used for this purpose and poor service is the result.

To meet this need, the Despard & Gordon Co., 557 West Jackson boulevard, Chicago, has developed a very simple and unique quick-make-and-break mechanism, with a wide breaking distance. It operates on an ingenious lever principle and is therefore given the appropriate trade name of "Levolier."

The movement has an oscillating contact arm actuated by an oscillating pall with an extension or spring connecting both. The contact arm itself has fiber insulating bearings at each end and a fiber insulating connector at the end for the spring which insulates the entire mechanism from the contact arm. The entire mechanism is smooth, positive and very simple, which insures constant service.

The lever that actuates the mechanism is a big step forward in lever construction. It can be pulled up, down, sideways or, in fact, in any direction or straight out, since it is riding around a fulcrum. When the lever is pulled in any direction it rights itself quickly and is ready for another pull. The lever and chain can be removed readily for refinishing by removing only one screw.

Leaving the chain off, the lever itself can be operated with a slight pressure of the thumb. It is found to be the most natural way to manipulate a socket without a chain, more so than a key.

The cap and shell were designed to give a very positive gripping surface around their entire circumference, so as to be very rigidly held together, but allowing at the same time the ready removal of the cap when desired. It is considered the most positive and durable looking means yet produced.

The Levolier socket is new in every feature and will doubtless come into much favor. It is made with three sizes of caps—pendent, ⅛ in. and ⅜ in.

The New Levolier Pull Socket, Rated at 660 Watts, 250 Volts.

NEW SANGAMO DIRECT-CURRENT, THREE-WIRE METER.

At the present time when great attention is being given to conservation and standardization, the new direct-current, three-wire, service type, watt-hour

Fig. 1.—New Sangamo Direct-Current Three-Wire Meter.

meter just placed on the market by the Sangamo Electric Co., Springfield, Ill., is attracting much attention.

This meter consists simply of two standard two-wire elements placed side by side in a common base and registering their kilowatt-hours on a common recording train so that the sum of the revolutions of the two elements will be properly added and indicated on the dial of the meter. This is effected by means of a very simple but ingenious differential gearing within the recording train so that no matter what load there may be on one element as compared with the other, the total revolutions of the two elements will be accurately added and recorded. Even with one element fully loaded and the other one without load, the registration is as accurate as though each element were recording on a separate train.

This arrangement of meter elements and train is not new, but has been given a thorough and successful test on similar ampere-hour meters built for use with storage batteries on submarine vessels of the United States Navy, during the past two years. The only difference between these very successful ampere-hour meters for submarines and the present three-wire service type meter is in the fact that the driving elements in the ampere-hour meters have permanent magnet fields instead of shunt energized fields of the watt-hour meter.

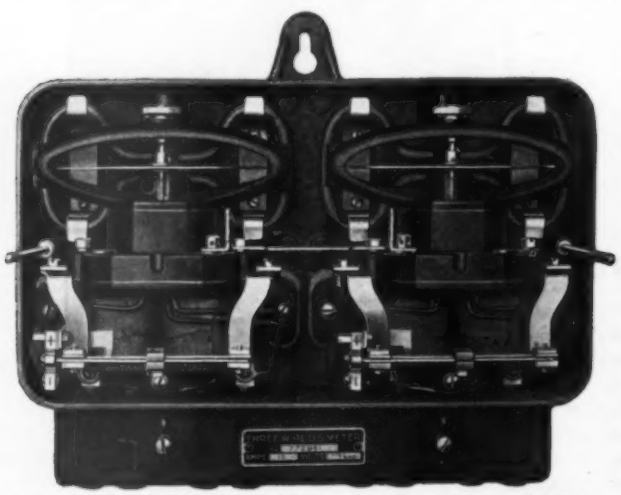


Fig. 2.—Meter With Case and Recording Train Removed, Showing Two Independent Standard Two-Wire Meter Elements.

As will be seen from Fig. 2, each element of the new three-wire meter is a standard two-wire element including the light-load adjustment, the arrangement of damping magnets, and in the case of meters over 10 amperes capacity, the arrangement of internal or external shunts. As shown in Fig. 3 and from the arrangement of the elements it will be apparent that this meter achieves for the first time the requirements of a true three-wire direct-current meter; that is, one which will measure and record accurately the load on either side of a three-wire distributing system, no matter whether the other side is entirely dead. For example, if the fuse in one outer line of the system is blown or purposely withdrawn, the element connected in the other side will record accurately the load on that side, as its potential circuit and measuring circuits are entirely independent of the side which is open. If the neutral fuse is blown or withdrawn, the two potential elements remain in series across the outer lines so that the meter will continue to record any load that may

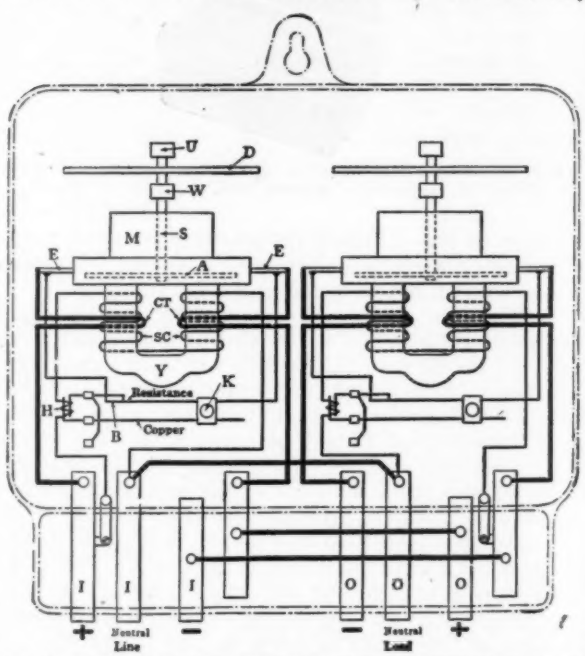


Fig. 3.—Wiring Diagram, Showing Internal Connections of the New Sangamo Three-Wire Meter.

pass through it between the outer wires with the neutral open. Under widely unbalanced conditions of voltage between the outer lines, this meter will record with a degree of accuracy which is impossible with any former three-wire direct-current meter having a single potential element connected either between one outer line and the neutral, or between the two outer wires.

The recording train is held on a bracket connecting the two motor elements, shown in Fig. 2 with the train removed, and absolutely correct meshing of the two worm wheels on the train engaging with the two elements is obtained by a system of locating rear bearings of the worm wheels similar to that used in the standard two-wire meter. The train is held in position by a simple locking device operated from the top front so that it may be readily removed for purpose of inspection and calibration of the elements.

In calibrating, each element is considered and tested as a standard two-wire meter without respect to the other element. For this reason, an absolutely perfect balance of the two elements may be secured in minimum time and effort by the tester.

The meter when connected occupies about the same space on the wall as an ordinary polyphase service-type alternating-current meter. This meter will be supplied in all capacities from the unshunted 10-ampere meter to the largest externally shunted capacities.

PERFORMANCE AND EQUIPMENT OF 2-TON ELECTRIC FURNACE.

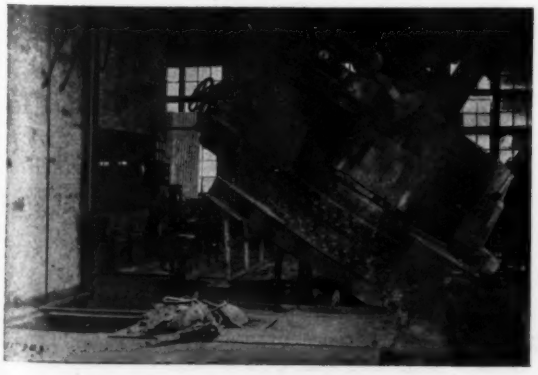
Interesting Installation in Plant of Driver-Harris Co., Maker of Nichrome-Resistance Alloy.

An electric furnace, whose main product is Nichrome, the well-known high-temperature resistance alloy, has recently been installed at the plant of the

View of 2-Ton Heroult Electric Furnace.

Driver-Harris Co., Harrison, N. J. The furnace is of special interest because of its electrical equipment, which is an excellent example of modern practice. Alloys of various characters are also manufactured by the furnace. It is of the Heroult arc type, featured with automatic regulation, and has a capacity of 2 tons.

Graphic wattmeter records of the power consumed have been obtained during two separate runs on 3000 lb. each of Nichrome and high nickel-steel. In both cases the charge consisted of the various metallic constituents fed into the furnace in solid state without preheating. These graphs showed clearly the operation of the furnace. The amount of power taken at the start of the heat is small in both cases, but as the resistance of the furnace circuit decreases, owing to the heating up of the electrodes and the consolidation of the charge, the power consumption rapidly increases until quite stable conditions are reached. The average amount of power consumed is then held practically constant by the automatic regulator.



View of Furnace Tilted for Pouring.

Night View of Furnace in Operation.

There is, however, no uniformity in the actual power consumption. As the charge melts down, pieces of metal fall in between the electrodes and establish short-circuits. For the most part these short-circuits are only momentary as the fragments causing them are promptly melted down, but occasionally they persist and then the automatic regulator draws up the electrodes until they are clear. This process sometimes breaks the arc and then there is a sudden decrease in the power consumption until the regulator brings the electrodes down again and re-establishes the arc. As would be expected, the nickel-steel alloy shows more of these irregularities than the softer Nichrome.

Towards the end of the run there is a marked change in the power consumption when the metal is given a special treatment before pouring. In the case

Pouring from the Furnace.

of the nickel-steel a higher temperature was necessary, perhaps to lower the carbon content, while with Nichrome the temperature was lowered. The temperature of the furnace averages about 2200 deg. F.

The high momentary overloads are characteristic of electric furnace work and make it very different from ordinary power service. They must be taken into account in designing the electrical equipment for the furnace, and some of the apparatus must be especially designed to withstand them, as shown in the following description of the Driver-Harris installation.

Power for this furnace is furnished in the form of 60-cycle, 2200-volt, two-phase current from the lines

of the Public Service Electric Co. In the high-tension lines are a disconnecting switch and an oil circuit-breaker. This latter is used to control the circuit. It can be operated manually and is also provided with low-voltage and overload protection. In order to prevent its operation on momentary overloads, the over-

Filling Ingot Molds With Electric Furnace Alloy.

load trip is controlled by relays with definite inverse-time-limit action. The high-tension apparatus and the transformers are contained in a brick compartment behind the furnace.

There are two 400-kv.-a., 2200/110-volt transformers of the oil-insulated, self-cooled type. They are Scott-connected so that they change the high-voltage two-phase current into low-voltage, three-phase current, so as to have one phase for each of the three electrodes of the furnace.

Special construction is necessary to withstand the overloads. These overloads are of such short duration that their heating effect is negligible but they tend to force the coils apart. Hence the coils are very firmly braced and are in fact capable of withstanding momentary overloads 15 times greater than the normal load.

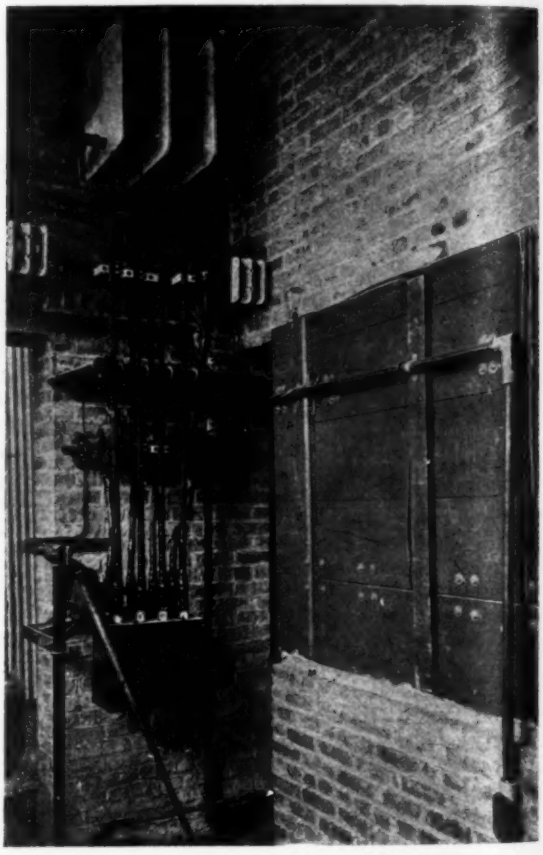
The reactance of these transformers is about double that of ordinary power transformers of the same size. This reactance, together with that developed in the low-tension leads (which are made as

General View of Thury Regulator for Furnace.

short as possible, in order to keep this factor low) prevents the current flowing through the furnace from exceeding five or six times normal values even on dead short-circuits. The voltage regulation is from 106 volts on no load to about 100 volts on full load, and the power-factor is from 85 to 90%.

One of the most interesting features of the equipment is the Thury regulator, which automatically maintains an approximately constant current at the furnace electrodes. Without this device the current consumption would vary eratically, even if an operator were constantly endeavoring to correct the variations. It, therefore, saves labor and current, reduces to a minimum the time required to prepare a charge and by providing uniform conditions, keeps the quality of the product uniform.

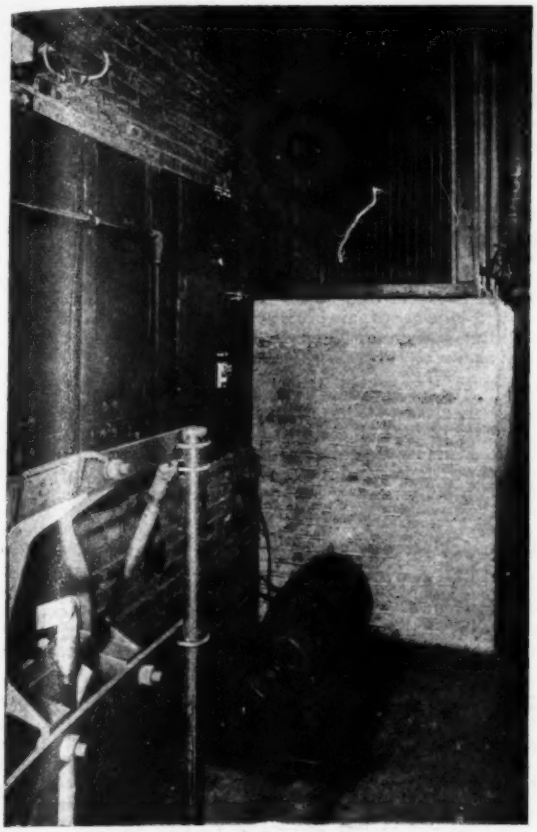
Each furnace electrode has a separate regulating mechanism and a raising and lowering motor. The regulator can be set for any desired current value and when this value is exceeded, each regulating mechanism closes a contact momentarily which causes the motors to raise the electrodes slightly. The contacts continue to close at brief intervals until the electrodes



Oil Circuit-Breaker, 2200 Volts, Type F. Disconnecting Switches Above.

are drawn up high enough to reduce the current to the predetermined value, the intermittent action being employed to prevent the electrodes from being raised too high and thus causing an unstable condition. When the current falls below the predetermined value the electrodes are lowered in a similar manner. The regulator itself is controlled by a solenoid energized by means of current from series transformers in the main high-tension circuit. Damping devices prevent the regulator from acting on overloads that immediately correct themselves. In addition to the automatic device, each electrode motor has a drum controller to permit manual operation when desired.

The electrode motors are direct-current machines, because alternating-current motors cannot be controlled with sufficient delicacy. The operating current is obtained from a 4½-kw. motor-generator set located in the transformer compartment. The motors are of



Westinghouse Motor-Generator Set for Supplying Direct Current for Thury Regulator and Electrode-Operating Motors. Two 400-kv-a. Transformers.

Three 2-hp. Totally Inclosed Type SK Motors Operating Electrodes.

2-hp. capacity and are totally inclosed. They are provided with grease-cup lubrication instead of the ordinary ring-oiling system so that the lubrication is not interfered with when the furnace is tilted for pouring.

When the charge is finished, the whole furnace is tilted bodily for pouring. This tilting is effected by an 11-hp. alternating-current slipring motor located in a pit beneath the furnace and geared to the tilting mechanism. It is controlled by a drum controller by the side of the furnace.

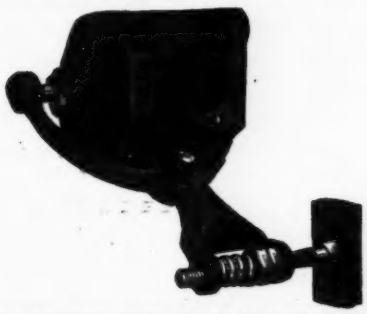
All of the equipment consists of standard electric furnace apparatus made by the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

MARINE WATER-TIGHT DOOR SWITCHES.

On all vessels traversing the sea in war time, it is essential, of course, that the interior be lighted adequately. It is also essential that the decks and exterior of the ship be submerged entirely in darkness, except for such inclosed lights as are necessary for running.

To open the door from a passageway upon the deck, without at the same time putting out the light,

Direct-Acting Water-Tight Door Switch.



Lever-Type Water-Tight Door Switch.

would be too likely to transmit a signal to a waiting submarine. The door switches which are illustrated here are designed, therefore, for the purpose of instantaneously extinguishing the light upon the door leading to the deck being opened, even slightly.

These devices are water-tight, made rugged throughout in order to stand up under marine service. The mechanisms are positive and quick in action; less than a quarter-inch movement in the door actuates the switch and makes or breaks the circuit.

They are made in two types, termed direct-acting and indirect-acting. In the direct-acting type, the plunger impinges directly against the door. In the indirect-acting, the door actuates a lever plunger protected by a spring against sudden slams or shocks. Both types are adjustable for any direction of conduit entrance and may also be adjusted for varying widths of door frame.

These switches are manufactured by the Benjamin Electric Manufacturing Co., 806 West Washington boulevard, Chicago, Ill.

Trade Activities

Conservation Work of Baltimore Plant of Western Electric —E. I. Van Doren Opens Edison Shop—Special Catalogs

American Steam Conveyor Corporation, 110 West 40th street, New York City, was recently awarded a contract by the Bureau of Yards and Docks, Navy Department, Washington, D. C., for installing ash-handling equipment valued at about $11,137 in the Annapolis (Md.) navy yard.

Thompson & Castleton, Seattle, Wash., were recently awarded a contract for furnishing and installing the motors in the foundry of the Northwest Motor Co., at South Park. Motors will be required to the extent of 200 hp., ranging from 10 to 100 hp. The foundry will cost approximately $150,000.

Monarch Electric Motor Co. announces its removal from 212 Center street to 166 Center street, New York City, where more commodious quarters have been engaged. The new offices and show rooms will be about three times the size of the former quarters and will enable the company to handle more efficiently its greatly increased business.

Westinghouse Electric & Manufacturing Co., Automobile Equipment Department, announces that on Dec. 1, 1918, it will close the Indianapolis office, now located at 512 Merchants Bank building, until after the war. The business for both the Indianapolis and Chicago districts will be handled out of Chicago. The office of the Automobile Equipment Department will be combined with the general offices of the company in the Conway building, Clark and Washington streets, Chicago. Prescott C. Ritchie, at present in charge of the Indianapolis office, will assume charge of the office in the new location.

E. I. Van Doren, who for several years past has been located at 332 River street, Troy, N. Y., with a complete line of electric motors and supplies, announces the opening of a new ground floor store, "The Edison Shop," on or about Nov. 9, at 81 Fourth street, where he will offer a new and varied line of electric motors, Mazda lamps, heating devices, etc. The business now located at 332 River street will be consolidated at the new address with the Edison Diamond Disc Shop, now located at 68 Congress street. Thomas P. Esmond, formerly local manager for the Edison Co., will continue in charge of the phonograph department.

Western Electric Co.'s plant at Baltimore, Md., is playing an important part in the work of conservation, saving and repairing telephone instruments. Materials are scarce and hard to get, and if a telephone or bell-box can be rebuilt, that much material is saved. It often happens that a particular telephone is beyond repair, but that parts of it are still good. These parts are kept and the rest junked. As sets come in from the telephone company they are carefully gone over by an inspector, who decides what repairs are required. Ringer coils are often found open. The old coil is removed and replaced by a good one. The old coil is then rewound and placed in stock, ready for service again. Often generators have to be removed from sets and taken apart to recharge the magnets. The Western Electric men even go so far as to repair condensers, which were formerly classed as junk after they had been out of service. Each piece of repair work is inspected in accordance with standard specifications before it is reissued. Owing to freight embargoes, shortage of steel, lumber and vital integral parts of apparatus, it is necessary more than ever before to reclaim equipment. The high cost of materials is another factor which has demanded the reissuing of repaired apparatus. The records of the Western Electric Co. for this year show that in all departments the quantity of work produced has exceeded that of other years by a large amount, proving that every man and woman is doing splendidly in keeping up the supply of material so constantly needed in the world of communication, both at home and on the field of battle.

Sundh Electric Co., 51 E. 42nd street, New York City, has filed a notice of authorization to operate a plant at 209 Parkhurst avenue, Newark, N. J. William E. Quimby will act as local representative for the company.

E. C. Atkins & Co., Indianapolis, Ind., manufacturers of "silver steel saws," has sold, through its San Francisco branch, the 12-inch band saws for the new sawmill of the F. S. Murphy Lumber Co., at Sloat, Cal. This mill replaces one destroyed by fire early in the year. The Atkins company lately made shipments of saws to Manila, P. I.

Baker-Joslyn Co. announces the removal of its San Francisco office and warehouse to 183-199 First street, corner of Howard. The new quarters are much more commodious and convenient and with their opening the company is enabled to give still better service to the trade. There is no change of address of the Seattle or Los Angeles branches.

Crocker-Wheeler Co., Ampere, N. J., has been granted permission by the Public Utilities Commission to construct a single-track railway across North 12th street, Newark. Both sides of North 12th street are owned by the company, and it is planned to erect a factory building on the east side of the street. An ordinance approving this action has been passed by the city.

Libbey Glass Co., Toledo, Ohio, recently taken over by the lamp division of the General Electric Co., is now producing lamp bulbs at the rate of 1,000,000 per week. This output will be further increased in the near future. The company at present is installing three machines for the production of gasoline gas in order to keep the factory running at times when the natural gas supply is shut off.

Robbins & Myers Co. has done a satisfactory business on the Pacific Coast this year through its San Francisco office. Among the new plants for which this company's motors were supplied were those of the California Associated Raisin Co., Fresno; the American Coin Register Co., Emeryville, Cal.; the F. E. Booth Co., Pittsburgh, Cal.; Liberty Iron Works, Sacramento; shipbuilding plant of Union Construction Co., Oakland; and the Vesuvia & Piedmont Paste Co., Los Angeles.

Walter A. Zelnicker Supply Co. announces the appointment of R. H. Wilson as assistant to the president, with headquarters at St. Louis. Mr. Wilson, who has been connected with the company for many years, and latterly as Houston representative, has been succeeded by B. O. Griffin. Mr. Griffin has for the past twenty years served the International & Great Northern Railroad as storekeeper and assistant general manager, and more recently was assistant to president of the St. Louis Southwestern Railroad in charge of purchases.

Benjamin Electric Manufacturing Co., with general offices and works at Chicago, Ill., is sending out a number of new pages for insertion in its catalog on marine lighting and signaling apparatus. The Benjamin company will issue additional sheets, covering new marine material from time to time. Particular attention is directed to the Benjamin-Starrett panel boards for marine service, illustrated and described on four pages, in Section E. One particular feature of the Benjamin-Starrett panel board is that the bus bars are completely enclosed in the base of the panel board and that the bases themselves are of non-absorbent material. Both of these features make this panel board especially good for marine service. Pages A-23 and A-24 are devoted to illustration and description of watertight door switches. These devices are especially adapted to present-day conditions, where safety in running requires that interior light be shut off immediately upon a door being opened to the deck.

Current News

Weekly Record of Construction Activities—Conventions

EASTERN STATES.

FAIR HAVEN, MASS.—In connection with the construction of a new local naval station base by the Government, Navy Department, considerable new electrical equipment will be required. Plans for this work are now being prepared.

WEST PENN, MASS.—West Penn Power Co. has awarded a contract to the Sanderson & Porter Co. of New York for a $5,000,000 power plant to be erected at Springdale on the 80-acre tract, which has been cleared.

BRIDGEPORT, CONN.—Ground has been broken for the construction of a new two-story boiler plant, about 100x101 feet, at St. Vincent Hospital, North Main street, to cost about $30,000. Schwarz Brothers, 95 River street, are the contractors.

STAMFORD, CONN.—Fire recently destroyed the power plant and a portion of the works of the Waterside Mills, in connection with considerable equipment, with total loss placed at approximately $100,000. It is understood that the company will rebuild at once.

BUFFALO, N. Y.—Prest-O-Lite Co. is having revised plans prepared for the construction of a local charging plant at Colgate avenue, Hopkins and Tifft streets, comprising four one-story structures.

BUFFALO, N. Y.—General Electric Co. is rushing to completion the construction of its new three-story power house and factory building, about 80x278 feet, located on Fillmore avenue, to cost about $200,000. It is expected that operations will be inaugurated at an early date.

CANISTEO, N. Y.—A. J. Anderson will operate an electric light plant here to furnish the city with street lighting.

DUNKIRK, N. Y.—The Water Board has made announcement that effective Dec. 1 a new schedule for rates for electric light and power service will be inaugurated. A 50 per cent increase will be made.

HERKIMER, N. Y.—The Municipal Commission, City Hall, has had plans prepared for the construction of a large one-story addition to the local boiler plant, to provide for increased operations. The structure is estimated to cost $50,000. H. B. Sweet, Clarendon building, Utica, is architect and engineer.

ITHACA, N. Y.—The Board of Public Works has given the city lighting contract for a period of ten years to the Ovid Electric Co., according to terms heretofore made public.

NEWFANE, N. Y.—Newfane Electric Light Co. has sold out to the Middleport Gas & Electric Co. This new company will supply light for the village houses from its Middleport plant, through Niagara Falls, as soon as necessary connections can be made. It is also expected that the streets will be furnished with light, after having been in darkness for several months.

NEW YORK, N. Y.—Powerlight Co., 210 Fifth avenue, has filed a petition in bankruptcy with statement showing liabilities of $39,307 and assets of about $94,864, consisting of stock, machinery, etc. The company operates a plant on Davis avenue, Arlington, N. J.

NEW YORK, N. Y.—United Electric Light & Power Co., 130 East Fifteenth street, has awarded a contract for the construction of the proposed one-story power station, screen and well house, about 40x50 feet. The Kenwell Contracting Co., 841 Broadway, is the contractor.

NEW YORK, N. Y.—Contract has been awarded by the Board of Managers of the Roosevelt Hospital, Ninth avenue and Fifty-ninth street, for the erection of the proposed one-story boiler plant, about 30x30 feet, at the institution. The Vacuum Ash & Soot Co., 2 Rector street, is the contractor.

NEW YORK, N. Y.—Acme Gas & Electric Fixture Co., 132 West Fourteenth street, has filed a petition in bankruptcy showing liabilities of $10,000 and assets of about $5,000. Peter B. Olney, Jr., has been appointed receiver by Judge A. N. Hand.

NORTH EAST, N. Y.—Borough officials have under consideration plans for the construction of a new municipal electric plant.

PELHAM, N. Y.—Plans for the construction of a new addition to the power plant at the local naval training station have recently been completed by the United States Government, Navy Department. Charles Ewing, New York City, architect.

CAMDEN, N. J.—John H. Mathis & Co., Front and Erie street, have awarded a contract to L. T. West, 828 Broadway, for the erection of a one-story boiler plant at its shipbuilding works, about 37x39 feet.

DOVER, N. J.—New Jersey Power & Light Co. has entered into a contract with the Radium Luminous Material Corporation, Boonton, for supplying electric energy at the plant of the latter company for operation. Fifty hp. will be required for machine work, and 450 kw. for electric furnaces.

GLOUCESTER CITY, N. J.—Pusey & Jones Co. has inaugurated operations in its new power plant recently completed. The new works are of brick construction, about 100x150 feet, with stack 200 feet high, and will be used for the operation of the two shipbuilding plants of the company at this place. The estimated cost of the plant is $700,000.

HOBOKEN, N. J.—Fire, on Oct. 27, destroyed a portion of the plant of the F. J. Rooney Lamp Co., Thirteenth street and Willow avenue, with loss estimated at about $8,000. The company was engaged almost exclusively in the manufacture of electric bulbs for the Government.

MORRISTOWN, N. J.—Morris & Somerset Electric Co. is making rapid progress on the repairing of one of its turbogenerator units, recently damaged by lightning.

NEWARK, N. J.—Baker & Co., 54 Austin street, have awarded a contract to Fred Kilgus, Inc., Newark, for the construction of a one-story brick and concrete engine room extension to their power plant, about 24x37 feet, at 416-18 New Jersey Railroad avenue. The structure will cost $8,400.

POMPTON LAKES, N. J.—The ordinance creating a bond issue for $60,000, to provide for the construction of the proposed new addition to the municipal hydroelectric plant, introduced at a recent meeting of the Borough Council, will be placed on final reading at the regular meeting of the Council on Nov. 7.

TRENTON, N. J.—Trenton & Mercer County Traction Co. has commenced the installation of new conduits in Lincoln avenue, as the initial steps for the elimination of electrolysis in Trenton. E. E. Brownell, an electrolysis expert employed by the city, has conferred with the officials of the company in reference to this subject.

ERIE, PA.—Northwestern Electric Service Co. has notified the Public Service Commission of a decrease in its capital stock from $2,500,000 to $80,000.

GREENVILLE, PA.—Mercer County Light, Heat & Power Co. has filed notice with the Public Service Commission of an increase in its rates for service.

KANE, PA.—Notice has been filed with the Public Service Commission of a $100,000 bond issue and the issuance of common stock for $254,712.50 by the Kane Electric Light & Power Co.

PHILADELPHIA, PA. — Arrangements have been completed by the Baugh & Sons Co., 20 South Delaware avenue, for the construction of the proposed new two-story boiler plant, about 38x46 feet, at its works. The structure, which will be of brick and concrete, is estimated to cost $20,000.

PHILADELPHIA, PA.—The United States Government has taken bids for the erection of a new one-story brick pump house (specification 3482) at Fort Mifflin. Wark & Co., 1737 Filbert street, have submitted the low bid at $4598.

PHILADELPHIA, PA.—In connection with improvements being made in the repair shop of the Philadelphia Rapid Transit Co., 810 West Dauphin street, located at Frankford avenue and Bridge street, two new electric cranes will be installed. The work is estimated to cost $45,000.

PHILADELPHIA, PA.—Philadelphia

Electric Co. has issued notice to consumers that the return to sun time will increase greatly the lighting and power loads between the hours of 4 p. m. and 7 p. m., the peak of the demand on its generating and distributing system. The company is using space in the local dailies setting forth that the co-operation of every business, every citizen and household is required in order that war industries depending on this service shall have full consideration during the critical period, and urging the use of strict economy in the use of electric light and power between these hours in order to avert a possible power shortage. The company states that all customers who have signed contracts for electric light and power are assured of continuous service in accordance with the terms of their contracts, in the event that no unforeseen contingency or emergency should arise.

PHILADELPHIA, PA.—Fire recently severely damaged the coal conveying system at the main power house at the Frankford Arsenal. The destroyed section will be replaced at once.

PITTSBURGH, PA.—A $15,000,000 power plant for the Pittsburgh War Industries Districts will be erected immediately in the Alleghany Valley. The Duquesne Light Co. will receive financial assistance in the project from the United States Government. Work on the new plant will commence at once.

BALTIMORE, MD. — Washington, Baltimore & Annapolis Electric Railway Co. has let the contract to the Union Switch & Signal Co. to install block signals on its double-track line between Naval Academy Junction, Md., 14 miles south of here, to the District of Columbia, about 15 miles.

BALTIMORE, MD.—Mt. Vernon-Woodberry Mills have awarded a contract to Gladfelter & Chambers, Thirty-sixth street and Roland avenue, for the construction of a new one-story power house, about 40x100 feet.

BALTIMORE, MD.—C. E. G., care of *Manufacturers' Record*, is in the market for compound engine generators, one each 100 to 150 kw., 300 to 375 kw., 220 to 440-volt, three-phase, 60-cycle. Describe fully and name cash price. He will also consider turbo units.

WASHINGTON, D. C.—The Senate Commerce Committee has arranged a substitute for the proposed emergency power bill recently passed by the House. The proposed new bill gives the War Industries Board complete authority to develop new electric power projects, etc., in sections where a power shortage for war work is evidenced, making $50,000,000 available for this purpose.

NORFOLK, VA.—The Bureau of Yards and Docks has taken bids for the construction of a new power plant at the local Government station, estimated to cost $6,000.

QUANTICO, VA.—The United States Government, Navy Department, has arranged plans for the erection of the proposed new local electric-generating station. The structure is estimated to cost $45,000.

CHARLOTTE, N. C.—A permit for additions to the buildings of the gas plant of the Southern Power Co. on South boulevard, Milworth, was issued. The contract calls for a $2000 addition to the plant, R. N. Hunter being the contractor.

DATES AHEAD.

American Society of Mechanical Engineers. Annual meeting, New York City, December 3-6. Secretary, Calvin W. Rice, 29 W. 39th street, New York, N. Y.

Florida Engineering Society. Annual meeting, Jacksonville, January 5, 1919. Secretary, J. R. Benton, Gainesville, Fla.

American Institute of Consulting Engineers, Inc. Annual meeting, New York City, January 13, 1919. Deputy secretary, B. Etchelle, 35 Nassau street, New York City.

Northern White Cedar Association. Annual meeting, Milwaukee, Wis., January 21, 1919. Secretary, N. E. Boucher, 702 Lumber Exchange, Minneapolis, Minn.

Western Association of Electrical Inspectors. Annual meeting, Chicago, Ill., January 28-30, 1919. Secretary, W. S. Boyd, 175 West Jackson boulevard, Chicago, Ill.

Oklahoma Utilities Association. Annual meeting, Oklahoma City, Okla., February 13, 14 and 15. Secretary, H. A. Lane, Oklahoma City, Okla.

New Mexico Electrical Association. Annual meeting, Albuquerque, N. Mex., February 17-19. Secretary-treasurer, Charles E. Twogood, Albuquerque, N. Mex.

CHARLESTON, S. C. — Charleston Consolidated Railway & Light Co. has awarded contract to the J. A. P. Crisfield Contracting Co., Graves Lane, Philadelphia, for improvements in its lighting plant to cost $750,000.

SPRINGFIELD, GA.—R. M. Davidson and others are interested in developing water power to supply electricity to Springfield and industrial plants.

SUMMERVILLE, GA.—The City Electric Light Co. has been organized here and franchise secured to furnish the city with electric lights.

NORTH CENTRAL STATES.

CHADRON, OHIO.—A new electric light plant will be installed. Address Engineer E. C. Thompson.

COLUMBUS, OHIO.—The city council has authorized the board of purchase to advertise for bids for the purchase of transformers at the municipal light plant. Address city clerk.

SOUTH AKRON, OHIO.—Firestone Tire & Rubber Co. will erect $75,000 power house. It will be fireproof, one story high and basement. 102x79 and 58 x60 ft. in size.

FT. WAYNE, IND.—Allen County Electric Light & Power Co. is asking increased rates for service, the petition filed with the Indiana Public Service Commission providing for an increase in electric rates. The company wishes a 15-cent rate and a $1.50 minimum basis to supplant the present 10-cent rate and $1 minimum. The company serves Woodburn, Harlan, Grabill and their neighborhoods.

MT. AUBURN, ILL.—Ernest M. Wurl has commenced the erection of a concrete building on his lots in Front street, just opposite the railroad station. The building when completed will be used to house a new electric lighting plant.

SPRINGFIELD, ILL. — Springfield Gas & Electric Co. is planning extensive improvements to its plants throughout the city. Address Commissioner Willis J. Spaulding.

WAUKEGAN, ILL.—The power house of the Guess-Pfleger Co., was damaged by fire.

MARQUETTE, MICH.—A new electric power plant will be built at a cost of $150,000. Address City Attorney Brown.

ABBOTTSFORD, WIS.—Abbottsford Electric Co. has increased its capital stock to $15,000.

ST. PAUL, MINN.—Contracts for electric and gas lighting of streets, parks and other public places were awarded to the St. Paul Gas Light Co. by the city.

ST. LOUIS, MO.—Oliver Electric Manufacturing Co. has awarded a contract to Amer & Zimmerman, 1228 Pine street, for the erection of a new two-story factory building to cost $45,000.

SOUTH CENTRAL STATES.

LOUISVILLE, KY.—Louisville Gas & Electric Co. has under consideration the extension of its transmission system to Stithton, for the purpose of furnishing electric energy to the Government station at that point.

LOUISVILLE, KY.—Gordon-Miller Coal & Coke Co. will soon commence the construction of a power plant at its properties for operation.

MEMPHIS, TENN.—Fire, Oct. 27, caused by the explosion of the main steam pipe in the plant of the Memphis Gas & Electric Co. affected large industrial plants in this vicinity depending upon the company for power for operation. Repairs will be made at once.

BIRMINGHAM, ALA.—Birmingham Railway, Light & Power Co. has under consideration improvements to its plant.

GADSDEN, ALA.—The water works pumping station will be equipped by the city for electrical operation. Three pumps with motors and other equipment will be installed.

MONTGOMERY, ALA.—The plants and properties of the Montgomery Light & Traction Co. have been acquired by Isadore Newman & Sons, New Orleans, La., for a consideration said to involve $2,000,000. It is understood that the new owners are planning for extensive improvements in the traction system to cost about $250,000.

WAYNE, ALA.—The city is planning for improvements in the local electric plant, including the installation of new machinery to increase the present capacity. The estimated cost of the work is $35,000.

BAY ST. LOUIS, MISS.—An electric railway is proposed from New Orleans, La., to Mobile by the Bay St Louis Electric Railway Co. of this city.

LITTLE ROCK, ARK.—The City Council is considering a proposition submitted by the merchants of that city, recommending the enlargement of the municipal electric light plant in order that it may furnish electrical service to commercial consumers. At present the plant supplies street-lighting service only.

SHREVEPORT, LA.—W. K. Henderson will install electric and mechanical equipment for the repair of generators, magnetos and other appliances.

HARTSHORNE, OKLA.—An elec-

tion will be called to vote on the proposal to grant a franchise to the Choctaw Power & Light Co., of McAlester, to construct and operate an electric light and power system in Hartshorne.

DALLAS, TEX.—Texas Electric Railway Co. contemplates the construction of an extension to the camp at Provident City to cost approximately $25,000.

WEATHERFORD, TEX.—The power plant at the Pythian Home was destroyed by fire. The loss includes engines, generators, a gas engine and boilers, valued at about $15,000, with no insurance. Power will probably be supplied to the home by the plant in this city.

WESTERN STATES.

GREAT FALLS, MONT.—Rapid progress is being made by the Montana Power Co. on the construction of a new high tension power line to extend to Conrad and Choteau. The line will be of 50,000 volts capacity, 32 miles in length, and is estimated to cost approximately $50,000.

TORRINGTON, WYO.—Citizens will vote on a $7500 bond issue for an eectric light system on Nov. 12.

JULESBURG, COLO.—Improvements to the municipal electric light plant to cost $70,000 are under consideration.

PASCO, WASH.—Pacific Power & Light Co. has submitted a proposal to the City Council for the installation of incandescent street lights to replace the present arc lighting system.

SEATTLE, WASH.—The Board of County Commissioners Tuesday granted the Chicago, Milwaukee & St. Paul Railway Co. a franchise to construct transmission lines for electrical power from Snoqualmie Falls to Cedar Falls, and from Snoqualmie Falls to Renton Junction via Preston, Issaquah and Renton. The franchise is granted for 38 years. The wires are licensed to carry 100,000 volts, and the power is to be used for the electrification of the company's lines from the Cascade summit to its coast terminals.

SEATTLE, WASH. — Skinner & Eddy Shipbuilding Corporation has had plans prepared for the construction of a new power plant at its shipbuilding works on Railroad avenue south, for operation. The structure is estimated to cost $20,000.

USK, WASH. — Mountain State Power Co. has completed plans for the construction of a new transmission line from Usk to Chewelah, a distance of about 20 miles. The work is estimated to cost approximately $90,000.

BUTTE CITY, CAL.—Great Western Canal Co. has had plans prepared for the construction of a large new power plant to have a capacity of approximately 500 hp.

LOS ANGELES, CAL.—In connection with the new service building to be erected at the site of the tubercular hospital at Sylmar, considerable new electrical equipment will be required. It is proposed to install six new refrigerating departments.

NEWPORT BEACH, CAL.—In connection with the installation of the new sewer system, contract for which was recently awarded to the J. D. Kneen Contracting Co., Santa Monica, at a cost of $172,371.14, a new pumping station will be erected. It is understood that the plant will be electrically operated.

RIVERSIDE, CAL.—The Nevada-California Power Co. and its subsidiary organization, the Southern Sierras Power Co., are planning for extensions in their power plants Nos. 2, 3, 4, 5 and 6, at Birch Creek, Inyo county, to increase the present capacity. The work is estimated to cost approximately $85,000.

SYCAMORE, CAL.—Pacific Gas & Electric Co. is planning for the construction of a new power line through Sycamore to a point near Colusa. In this connection a construction camp to accommodate about thirty men has been built.

WOODLAND, CAL.—It is said that the Pacific Gas & Electric Co. has completed arrangements for the construction of a new substation at Knight's Landing, Yolo county, estimated to cost in the neighborhood of $250,000. It is understood that the new plant will be used to connect up a line to Colusa, at which point it will connect with the lines of the Northern California Co.

EUREKA, CAL.—Western States Gas & Electric Co. will erect an aerial transmission line across the bay to replace the submarine cable recently destroyed. Electricity for local service is being supplied by the electric generating plant of the Hammond Lumber Co. at present.

CANADA.

ANYOX, B. C.—In connection with a plant now in course of construction by the Granby Consolidated Mining Co. for the production of coke, ground has been broken for the erection of a new power plant for operation.

EYEBROW, SASK.—Carlyle & Seeley plan the installation of a small electric lighting plant to light the business section of the town.

GRANDE PRAIRIE, ALTA.—The town council has passed an ordinance authorizing the construction of an electrical plant.

INCORPORATIONS

ELECTRIC WELDING OUTFIT.—Bids will be received by the Superintendent of Lighthouses, Tompkinsville, N. Y., until Nov. 14, for one electric welding outfit. Schedule No. 5470.

CABLE AND WIRE.—Bids will be received by the Navy Department, Bureau of Supplies and Accounts, Washington, D. C., for the following material: Schedule 1976, electric, lead-covered cable, 650 feet armored, portable cable, for delivery at the San Francisco navy yard, and copper, standard, duplex wire, for delivery at Washington, D. C.; schedule 1992, lead, soft wire in 5-pound spools; schedule 1991, steel, fish, flat, flexible wire, welding, iron or steel, mild wire, delivered at various shipyards, iron, black, annealed wire, delivered at New Orleans, La., iron or steel, soft wire and steel, crucible, spring tempered wire and 8850 lb. sounding, deep-sea, steel wire; schedule 1993, phosphor-bronze wire, brass, hard, spring wire and copper, hard wire, 1-lb. spools.

MOTOR-DRIVEN LATHES, CABLE, ETC.—Bids will be received at the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., for furnishing the following: Schedule 1975, 12-inch, gear head, motor-driven lathes and slotting machines to be delivered at the South Charleston (W. Va.) navy yard, and schedule 1976, lead-covered electric cable, portable armoured cable, and duplex standard copper wire. Firms desiring to submit proposals should give schedule numbers for the above items.

PROPOSALS

IRVINGTON, N. J.—Lionel Corporation, operating a plant for the manufacture of electric and mechanical toys, etc., has been incorporated with a capital of $50,000. Incorporators: Albert T. Cowen, J. L. Cowen, and M. Frankel.

BROOKLYN, N. Y.—Harding Electrical Co. Nominal capital $5000. To engage in electrical contracting. Incorporators: E. Lagerquist, B. Thistle, and L. H. Harding, 241 Quincy street.

WEST ORANGE, N. J.—Reliable Electric Plating Co. Capital, $50,000. To operate an electric plating establishment. Incorporators: J., H., and Adolph Danbeck, West Orange.

EVANSVILLE, WIS.—Porter Electric Line Co. has incorporated with a capital $6000 to operate electric transmission line. Joseph D. Porter, incorporator.

GRANGER, MINN.—Granger Telephone Exchange Co. has incorporated with a capital of $4000 to operate telephone lines. Incorporator: J. A. Ludwig, Granger.

WHITE LAKE, S. DAK.—Union Telephone Co. has incorporated with a capital of $2500 by C. H. Glissendorf.

NEW YORK, N. Y.—The Contractors' Machinery & Export Company, Inc. Capital, $100,000. To manufacture boilers, engines, etc. Incorporators: W. Catlin, J. N. Morton and J. R. Rodriguez, 1140 Jefferson avenue, Brooklyn.

MAYBROOK, VA.—Mutual Telephone company. Capital, $10,000. To operate a local telephone system. Incorporators: Jacob F. Williams and Elmer B. Siff, Maybrook.

LOVELL, ME.—Lovell United Telephone Company. Capital, $50,000. To operate a telephone system in Oxford and Cumberland Counties. Incorporators: J. H. Woodward, C. E. Jones, W. C. Bassett, and W. H. Smith, Lovell.

FRESNO, CAL.—In connection with the construction of the new fruit packing and storage plant of the Rosenberg Brothers Company, of Los Angeles, a one-story reinforced-concrete power house for works operation will be erected. The structure will be about 46x85 feet. When completed, the entire plant is estimated to cost about $500,000.

NIAGARA FALLS, N. Y.—Falls Equipment Company, Inc. Capital, $100,000. To manufacture electrical, mechanical, heating and lighting equipment. Incorporators: F. W. Korff, Lockport; C. Jones, and R. D. Glennie, LaSalle, N. Y.

Personal

Charles G. Du Bois Vice President of Western Electric — J. R. Wilson Joins Industrial Controller Co. — Changes

E. E. OMEYER, for some time in charge of the insurance matters for the United Gas & Electric Engineering Corp., New York, has resigned.

A. M. BALDWIN, formerly manager of the Duluth office of the Northwestern Electrical Equipment Co., has returned to the St. Paul office to assume the duties as manager of sales.

T. D. RAUCH, who left the Little Rock Railway & Electric Co. last June to take up radio work, has been transferred to Camp Taylor, Kentucky, and is now a corporal after two months in the service.

P. R. McCOMAS has been named general manager of the Illinois Central Electric Railway Co., with headquarters at Canton, Ill. Mr. McComas has had a number of years' experience in both steam and electric railway work and was formerly assistant general manager of the Peoria & Pekin Union Railroad Co., Peoria, Ill.

BERNARD J. DILLON, who recently joined the staff of the ELECTRICAL REVIEW as assistant editor, has had over nine years' experience with prominent electrical companies. He is a native of Pittsfield, Mass., where he served in the works of the General Electric Co. in transformer tests for about three years. In 1912 he came to Chicago and joined the large organization of the Commonwealth Edison Co. For several years he was a district inspector and more recently supervising inspector of this well known central-station company. His experience in inspection and construction work may be counted on to bring before the industry much valuable information along these lines. Mr. Dillon is an active and alert young man who has keenly observed and studied electrical construction methods, and the benefits of his observations will be made available to our readers.

CHARLES A. SEMRAD, who has been acting as general manager of the Western Light & Power Co. since April of this year, has been appointed to that position with headquarters at Boulder, Colo. He is a graduate of the University of Wisconsin and was for some time connected with the Madison Gas & Electric Co., Madison, Wis. In 1909 Mr. Semrad joined the Northern Colorado Power Co., the predecessor of the Western Light & Power Co., later becoming manager of the Cheyenne Light, Fuel & Power Co., of Cheyenne, Wyo., one of the subsidiaries of the Western Light & Power Co. In April of this year he was transferred to Boulder as acting general manager at which time H. U. Wallace resigned to accept a commission as major in the army. Mr. Semrad is president of the Wyoming Central Station Association, a member of the Wyoming legislature as representative from Cheyenne, and is also very active in civic, social and business affairs.

E. A. HAYS, auditor of freight and passenger receipts of the Illinois Traction System, with headquarters at Champaign, Ill., has been made auditor of passenger business alone. Mr. Hays has held the position of auditor of receipts for the past eight years.

CHARLES G. DUBOIS, who has for many years been connected with the Western Electric Co., has been elected to the vice presidency of the company. Mr. DuBois entered the employ of the company in 1891 at its New York office, and occupied successively the positions of chief clerk, secretary and supervisor of branch houses. In 1907 he became comptroller of the American Telephone & Telegraph Co. and in this capacity

Charles G. DuBois.

inaugurated and supervised a comprehensive system of accounting for the Bell Telephone System. During the winter of 1917-1918, Mr. DuBois was in Washington acting in the capacity of comptroller of the American Red Cross, which position he still retains. Mr. DuBois is 48 years of age and was graduated from Dartmouth College in 1891. He is director of the Mercantile Trust & Deposit Co. of New York, the 195 Broadway Corporation, the Western Electric Co. and other corporations.

THOMAS SPROULE, in charge of the overhead-line construction department of the Philadelphia Electric Co., is president-elect of the Pennsylvania Electric Association. Mr. Sproule was born in Philadelphia, where he received his early education, being graduated from the Central Manual Training School. He first became employed in pattern making, but later, in February, 1895, he entered the employ of the Brush Electric Co., since merged with the Philadelphia Electric Co., as draftsman. In this connection he became particularly interested in aerial and street-lighting work, and in 1902 he was promoted to be assistant to the engineer of that department. Mr. Sproule has been a member of the overhead-line committee of the N. E. L. A. since the formation of that committee and served as its chairman two years, 1914 and 1915, during which time the handbook on overhead-line construction was written and issued by the committee.

T. RANDELL DUBOIS, formerly connected with the Bijur Motor Lighting Co., Hoboken, N. J., has become associated with the United States Light & Heating Corporation, Niagara Falls, N. Y.

CHARLES McGOWAN, Hackensack, N. J., has been appointed manager of the Englewood, N. J., office of the New York Telephone Co. L. E. Bailey, of Jersey City, will succeed Mr. McGowan in the Hackensack office.

J. C. ROCKWELL, the present general manager of the Manila Electric Railroad & Light Co., is being placed in full charge of the affairs of that company in Manila by the J. G. White Management Corporation, New York, N. Y., the operating managers of the property.

W. J. HISS, formerly general manager of the Missouri branch of the Southwestern Telephone Co., has been appointed assistant director general for military relief of the American Red Cross. He will devote his entire time to this work and will be located at Washington, D. C.

C. NESBIT DUFFY has resigned as vice-president of the Manila Electric Railroad & Light Co., Manila, P. I., to accept the position of vice-president of the Visayan Refining Co., Manila, P. I., one of the largest cocoanut oil companies in the Philippine Islands. Mr. Duffy is to take over his new duties on Nov. 1.

CHARLES H. FORSGARD has been appointed district manager of the Western Light & Power Co. in its northern division, which includes the towns of Berthoud, Fort Collins, Greeley, Gilcrest, Loveland, Windsor, Wellington, and adjacent territory, with headquarters at Fort Collins, Colo. Mr. Forsgard is a graduate of the Texas Agricultural and Mechanical College. He was manager of the Childress Division of the Texas Gas & Electric Co. Previous to that he was connected with the Houston Lighting & Power Co., Houston, Tex.

J. ROBERT CROUSE, prominent member of the Advisory Board, National Lamp Works of the General Electric Co., Cleveland, Ohio, is now general chairman of the war exposition to be held in Cleveland, Nov. 9 to 17. Mr. Crouse has been very busy throughout the year as head of the War Savings Stamp campaign in Cleveland, which has undertaken to raise $16,000,000 toward the sale of war saving and thrift stamps. His plans for the war exposition will make this one of the best presentations of this important collection of war exhibits that has yet been presented in this country.

MATTHEW C. BRUSH, vice-president of the American International Corporation, Philadelphia, Pa., has been elected chairman of the board of directors of the Boston Elevated Street Railway.

CHARLES EDISON, of the Edison interests, was one of the principal speakers at a recent meeting of employes of the company at West Orange, N. J., held for the purpose of talks on "safety in the plants."

CAPT. W. C. BARBOUR, formerly connected with the Pacific Telephone & Telegraph Co., and who at the beginning of his military service was in command of Company E of the 411th Telegraph Battalion, has assumed command of the 403rd Telegraph Battalion, now overseas.

W. M. FABER, chief engineer of the American Steel & Wire Co., Cleveland, has been asked by Ohio state authorities to lead the fuel conservation movement in northeastern Ohio. Sixteen counties will be under his supervision. These will be divided into ten districts and each will have its head.

B. C. HOLST, who formerly covered the Iowa territory of the Northwestern Electric Equipment Co., St. Paul and Duluth, Minn., has been placed in charge of the new specialty department recently created. This department covers the sales of heating material, washing machines, vacuum cleaners, and various other specialties. E. V. Brown succeeds to the position of Mr. Holst in the Iowa territory.

FRANK FLEMING, formerly assistant auditor of receipts for the Illinois Traction System, with headquarters at Champaign, Ill., has been appointed auditor of freight receipts. He has been assistant to E. A. Hays for several years but with the division of the work into an auditorship of freight and an auditorship of passenger business, Mr. Fleming will have an independent position as auditor of freight receipts. These changes were effective Nov. 1.

WILLIAM B. MCKINLEY, Champaign, Ill., president of the Illinois Traction System and congressman from the nineteenth Illinois district, has returned from a six weeks' visit to the western battlefront in Europe. Mr. McKinley visited 600 miles of the front during his trip and was the guest of the English and French governments. He traveled for the most part in an automobile and made a thorough investigation of the general British and French military positions. While giving full credit to the valor and bravery of the American troops, as well as those of our allies, Mr. McKinley paid especial attention, during his trip, to the business management of the military forces, noting the problems of transportation, electric lighting, feeding, clothing and arming the allied troops. He was much impressed with the double track railways constructed in France and equipped with American locomotives, as well as by the electric lighting plants which have been set up in various parts of the allied front. The general splendid business efficiency manifested by the American British and French armies was a theme of special consideration by Mr. McKinley. Big business problems in all of their broadness and scope are here carried out as nowhere else in the world. Mr. McKinley was accompanied on the trip by Newton M. Harris, vice-president of the First National Bank of Champaign, Ill.

T. F. JOHNSON has been promoted from superintendent of transmission and distribution of the Georgia Railway & Power Co., Atlanta, Ga., to assistant superintendent of the electrical department. Mr. Johnson was born in Savannah, Ga., in 1887, and was graduated from the Georgia School of Technology in mechanical engineering in 1908 and in electrical engineering in 1910. Since his graduation from that institution he has been continuously in the employ of the former company in various positions. He is the inventor of several devices for handling live lines and for changing insulators on live lines operating on voltages as high as 110,000. Among his devices is the Johnson lamp.

J. R. WILSON has severed his connections with the Union Switch & Signal Co., Swissvale, Pa., to accept the appointment of general superintendent of the Industrial Controller Co. of Milwaukee. Mr. Wilson was associated with the Union Switch & Signal Co. for twenty years, during which time he served in various capacities in assembling, inspection and manufacturing departments, and also spent several years traveling for the company in connection with special railroad work. For several years prior to his resignation he was in charge of the manufacturing business of the company.

J. R. Wilson.

THOMAS W. SHELTON, general superintendent of the Kankakee and Urbana Traction Company, Urbana, Ill., since July 1, 1913, has resigned. He has not decided upon his immediate future. Mr. Shelton has been for 30 years associated with electric railway and electric lighting utilities at Cleveland, Ohio; Indianapolis, Ind.; Akron, Ohio; St. Louis, Mo., and Urbana, Ill. His first connection was with the old Brooklyn Street Railway Co. of Cleveland, Ohio, whom he served for 10 years being sent from point to point in construction work, as well as in repairs of cars, power plants and overhead work. He followed this work with two years service with the Indianapolis Street Railway Co., now leased to the Indianapolis Traction & Terminal Co., giving attention to overhead construction and overhead repairs as well as repairs to rolling stock. His next connection was with the Northern Ohio Traction & Light Co., Akron, Ohio, where he went in 1900 for four years' service, supervising power plant work and assisting in operation of electric lighting fixtures and services. He aided in the construction of the Fort Wayne & Springfield Traction Co., which operated at one time between Fort Wayne and Decatur, Ind., and served this company both as mechanical and electrical engineer. In 1908 he became connected with the Indianapolis, Columbus & Southern Traction Co. as master mechanic. In 1910 he joined E. D. Bell, general superintendent of the St. Louis properties of the Illinois Traction System for three years' service in general operation and supervision of various features of the St. Louis business of this company. He went to Urbana, Ill., in his position as general superintendent of the Kankakee & Urbana Traction Co., July 1, 1913, devoting special attention in his first three years there to outside construction work, the line from Rantoul, Ill., to Paxton, Ill., being built during that period.

Obituary.

WILLIAM MORTIMER COMSTOCK, connected with the Brooklyn Edison Co., Brooklyn, N. Y., as engineer and inspector, died recently at his home, 398A Ninth street, Brooklyn.

JAMES W. CALLAHAN, Brooklyn, N. Y., for forty years manager of the marine department of the Western Union Telegraph Co., died on October 12, at his home, 279 Warren street. Mr. Callahan was 66 years of age.

HOWARD H. DUFF, for the past year assistant to Vice-President Joseph B. Crane, of the Lehigh Navigation Electric Co., Hazleton, Pa., died on Oct. 24, from pneumonia. Mr. Duff was 35 years of age.

ALLAN C. CHOATE, purchasing agent of the Eastern Pennsylvania Railways Co., died of pneumonia on Oct. 13, in Pottsville, Pa. He was a son of Joseph K. Choate, vice-president of the J. G. White Management Corporation, New York, N. Y.

LIEUT. CHARLES R. SEED, U. S. N. R., superintendent of power of the Worcester (Mass.) Electric Light Co., died recently at Worcester from pneumonia. Lieutenant Seed was widely known among central-station circles in New England. He was born at Lawrence, Mass., in 1875, and after completing a course in engineering on the Massachusetts nautical training schoolship *Enterprise*, he spent seven years as an engineer in transatlantic service. He was subsequently employed as a stationary engineer in industrial concerns at Utica, N. Y., and Blackstone, Mass., and as chief engineer of the Rockingham County Light & Power Co., at Portsmouth, N. H. In 1911 he became chief engineer of the Webster Street plant of the Worcester company and shortly thereafter was made superintendent of power. When war with Germany was declared, Mr. Seed offered his services and was soon ordered to report at the Boston Navy Yard, having been commissioned as ensign. He was granted a leave of absence for the period of war and had hoped to have him resume his former office at its termination. After serving for a short time along the coast of France, he was promoted to lieutenant and was on patrol duty for almost a year. In June, 1918, Lieutenant Seed returned to the United States and was assigned for duty in the Fore river shipyards at Quincy, Mass.

Recent Patents

Selected and Summarized by Albert Scheible, Patent Attorney, 79 West Monroe Street, Chicago, Illinois

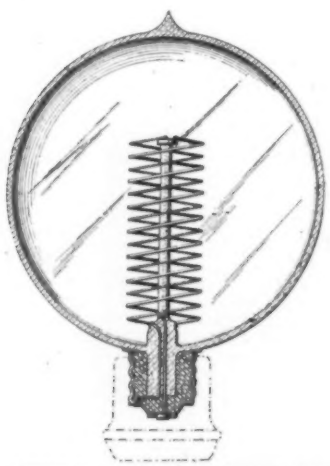
A series of brief comments on some of the recently issued electrical patents which appear to be of particular interest to our readers, the number after each heading being that of the United States patent to which the summary relates. Any correspondence regarding such patent matters should be sent direct to Mr. Scheible at the above address.

Wireless Apparatus (1,279,850).—On opening the primary circuit of this apparatus, patented by William Dubilier (of New York City) oscillations from a condenser are produced in an oscillating circuit and extinguished by a vibrator gap.

Circuit-Breaker (1,279,781). — This patent, also assigned by Halfdan A. Steen to the Allis-Chalmers Mfg. Co., shows a circuit-breaker in which a rotating magnetic field is established about the arc drawn between the contacts when the latter are separated. The patent reads as broadly covering the "establishing about such contacts of a magnetic field whose axis is variable as to position."

Resistance Wire (1,279,252). — A sheathed wire, described by John A. Capp (of Schenectady), in this patent, assigned to the General Electric Co., has a core of a high-resistance wire composed of about 55 per cent iron, 35 per cent nickel and 10 per cent manganese. This is inclosed in a metal tube, with a layer of powdered insulation between the wire and the tube, and the resulting composite wire is then drawn down to the desired diameter.

Incandescent Lamp (1,279,789).—As a novel means for preventing undue vibration in a lamp filament, Frederick G. Tilley (of St. Louis, Mo.) uses a filament coiled about a post, and a glass-hard steel coil having its turns midway between those of the filament. He claims that movements of the filament coil will then be opposed by the magnetic traction of the convolutions of the permanent magnet, and also claims that if this is of a highly tempered steel, it will not be readily demagnetized by the heat of the filament.

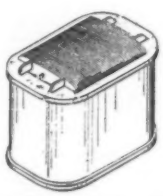


No. 1,279,789.—Coiled Incandescent Lamp.

Gear-Shifting Mechanisms (1,279,765 to 1,279,768).—Four arrangements of electrically actuated gear-shifting mechanisms are shown in these patents to Albert J. Schoenbein, of Fort Wayne, Ind.

Electric Switch (1,279,779). — Besides using contacts made of a group of laminations, Halfdan A. Steen (of Milwaukee, Wis.) provides a lever arrangement for clamping the laminae against the abutment with which they contact. (Assigned to the Allis-Chalmers Mfg. Co. on an application filed in 1911.)

Field-Pole Construction (1,279,643). —To hold the winding in its proper position on a core built up of thin plates, Arthur J. Brown (of Milwaukee, Wis.) bends the tips of the outermost plates over the edges of the winding.



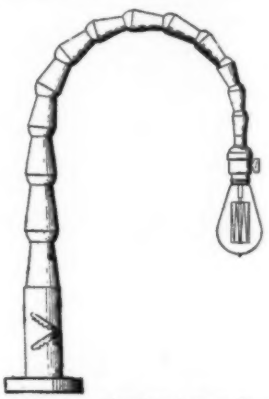
No. 1,279,643.—Field-Pole Construction.

Time Circuit-Controller (1,279,647). —Where electrically controlled devices require current for a definite time for their operation, James W. Bryce (of Bloomfield, N. J.) provides a clockwork mechanism which automatically breaks the circuit if the normally required time is exceeded to a predetermined extent. The patent was assigned to the International Time Recording Co., of Endicott, N. Y.

Magnet Control (1,279,653). — To vary the periodicity with which a magnet is energized, Allen D. Cardwell (of New York City) causes the magnet to make and break its own circuit. Then he imposes on this circuit the periodicity of an oscillatory circuit, which periodicity is a multiple of that of the means for energizing the magnet.

Making Mirrors (1,278,521). — For small mirrors, Edgar D. Tillyer (of Southbridge, Mass.) deposits a reflecting surface of silicon electrically on a transparent backing.

Light Support (1,279,803).—Details of a flexible lamp support are described in this patent to George F. Watson (of Rockland, Me.). Employs universal-jointed sections.



No. 1,279,803.—Flexible Lamp Support.

Arc Lamp (1,279,618). — Magnetic clutch-lifting means are described in this patent, recently issued to James H. Wagenhorst (of Akron, Ohio) on an application filed by him in 1912.

Making Condensers (1,279,941).—To make a rolled condenser, Phillips Thomas (of Edgewood Park, Pa.) rolls strips of metal foil between dielectric sheets. These sheets are wider than the foil and both edges of the sheets are folded over to compensate for the thickness of the foil.

Cooling Current Collectors (1,279,666).—Fan blades are mounted on the insulating supports for leads connected to the windings of the rotor of a dynamo, these blades being in such a position as to cause a circulation of air through a filter screen into a casing which houses the current-collecting devices. The patent was assigned by Rae W. Davis (of West Allis, Wis.) and Robert B. Williamson (of Milwaukee) to the Allis-Chalmers Mfg. Co.

Storage-Battery Plates (1,279,508). —To make a lead storage-battery plate, Frederick Wright (of Poughkeepsie, N. Y.) first pastes the grid with a mixture of equal parts by weight of battery lead and of red lead moistened with dilute sulphuric acid, and dries the pasted plates at room temperature. Before forming the resulting plates, he paints them over lightly with a small quantity of concentrated sulphuric acid to densify and harden the active material, and to facilitate the forming treatment.

After the War, What ?

X.

In the Scramble for Business That's Coming

The war has taught a great many non-advertisers the value of a name known to the consumer, and a number of those with an established trade-marked brand whose production has been taken over by the Government are taking the public into their confidence and frankly telling them the facts.

The lack of preparation for war has made keen business men realize the necessity of preparing for peace, and a number of large live organizations have established permanent committees to study after-the-war possibilities.

Unless some definite plans are made to keep the wheels turning after the war in plants that are now filling Government orders, millions of dollars worth of plants and equipment will go to the junk-pile.

Instead of being a prostrate and bankrupt nation after the war, this is going to be the richest country in the world.

But there's going to be a scramble for business, and a name that is known to the consumer will act as the best "stabilizer" in the free-for-all cut-price competition that a good many think is inevitable in this country when the Allies make the Kaiser put together that little "scrap of paper" that he tore up in Belgium.

G. C. SHERMAN.

THIS extract from a communication in Printer's Ink by the President of Sherman & Bryan, Inc., 79 Fifth Ave., New York, contains some very pertinent suggestions. Give them a little more than the "once over."

C. A. Tupper, President . CHICAGO
INTERNATIONAL TRADE PRESS, Inc.

Financial News

Financial Status of Seattle Lighting Department.

Seattle City Comptroller has issued the following financial statement of the City Lighting Department, covering six months ended June 30, 1918:

Income:	
Commercial lighting	$484,298.95
Municipal street lighting	102,002.47
Commercial power	132,509.49
Municipal building lighting	13,388.74
Municipal power	18,582.73
Public buildings and grounds lighting	16,019.31
Other public institutions, power	12,482.95
Self-consumed service	12,138.75
Miscellaneous operating revenue	3,149.59
Miscellaneous revenue and expense	2,073.28
Total revenue	$796,646.26
Expenditures:	
Production, water power	$ 38,295.04
Production, steam power	97,483.27
Production, electric current purchased	12.99
Transmission and transformation	22,416.11
Storage	60.00
Utilization	39,221.39
Distribution	53,323.45
Commercial	65,358.01
General	38,005.11
Miscellaneous revenue and expense	9,042 51
Interest on warrants	12,254.18
Interest on general bonds	46,587.48
Depreciation and amortization	104,629.32
Profit and loss	1,426.98
Total expense	$528,115.84
Net profit for six months	268,530.42

Galesburg Company Operates at Loss.

The Galesburg Railway & Light Co., Galesburg, Ill., operated cars during the month of September at a loss of $1,707.44, according to figures submitted by General Superintendent Carley. The operating cost for the month of September, exclusive of taxes, was $13,586.91, while the gross receipts were $14,874.35, leaving a deficit of $1,287.44. The tax apportionment amounted to $420, leaving a total deficit of $1,707.44. The deficit for the month of October will be reduced below this figure due partly to the seven cent fare, which increased fare was collected but for ten days in September. The company is new seeking to operate one-man cars on certain lines.

Sayre Electric Files New Tariff.

The Sayre Electric Co. has filed with the Public Service Commissions of the State of New York and Commonwealth of Pennsylvania a new tariff, effective October 20. The new tariff increases all of the rates 20 per cent with the exception of the temporary rate, which remains the same.

Dividends.

Montreal Light, Heat & Power Co. has declared a quarterly dividend of 1% payable Nov. 15 to stock of record Oct. 31.

Cedar Rapids Manufacturing & Power Co. has declared a quarterly dividend of three-fourths of 1 per cent, payable Nov. 15 to stock of record Oct. 31.

Kaministiquia Power Co. has declared a quarterly dividend of 2 per cent, payable Nov. 15 to stock of record Oct. 31.

Columbia Gas & Electric Co. has declared a quarterly dividend of 1%, payable Nov. 15 to stock of record Oct. 30.

The directors of Cities Service Company have declared the regular monthly dividend on preferred stock of ½ of 1 per cent in cash at the rate of 6 per cent per annum and on the common stock the regular dividend of ½ of 1 per cent in cash or 6 per cent per annum, and ¾ of 1 per cent in common stock at the rate of 9 per cent per annum. These dividends are payable December 1 to stockholders of record of November 15.

CHICAGO TELEPHONE CO.

July gross, $2,308,442, increase $536,880; net after taxes, $702,477, increase $544,134.

CONSUMERS POWER CO.

September gross, $569,829; net, $267,958; fixed charges, $163,630; preferred dividends, $50,198; surplus, $54,135.

GREAT WESTERN POWER CO.

For September—	
Gross earnings	$ 404,256
Operating expenses and taxes	152,068
Net earnings	252,187
12 months ended Sept. 30—	
Gross earnings	4,398,374
Operating expenses and taxes	1,725,613
Net earnings	2,672,761
Net income	994,978
Balance	754,978

NORTHERN STATES POWER CO.

For September—	1918.
Gross earnings	$656,774
Net earnings	245,906

NEW JERSEY POWER & LIGHT CO.

Earning statement for September—	1918.	1917.
Operating revenue	$27,143	$18,564
Operating expenses and taxes	16,502	11,185
Operating income	$10,641	$ 7,379
9 months ended Sept. 30.—	1918.	1917.
Operating revenue	$212,373	$160,066
Operating expenses and taxes	$140,334	100,118
Operating income	$ 72,039	$ 59,948

DAYTON POWER & LIGHT CO.

	Report for September, 1918.	Report for September, 1917.	Report for 9 months ended September 30, 1918.	Report for 9 months ended September 30, 1917.	Report for 12 months ended September 30, 1918.	Report for 12 months ended September 30, 1917.
Gross earnings	$201,457	$148,535	$1,683,768	$1,311,892	$2,252,494	$1,787,376
Operating expenses (including depreciation and taxes)	135,562	97,007	1,177,881	890,396	1,554,030	1,241,157
Net earnings	$ 65,895	$ 51,528	$ 505,887	$ 421,496	$ 698,464	$ 546,219
Non-operating revenue	2,822	2,080	23,636	7,488	26,482	9,388
Total income	$ 68,717	$ 53,608	$ 529,523	$ 428,984	$ 724,946	$ 555,607
Interest on bonds	$ 32,192	$ 15,121	$ 256,935	$ 136,258	$ 302,298	$ 181,870
Other deductions (includes other interest and sinking fund)	12,197	10,011	106,048	91,374	139,031	113,908
Total deductions	$ 44,389	$ 25,132	$ 362,983	$ 227,632	$ 441,329	$ 295,778
Net income	$ 24,328	$ 28,476	$ 166,540	$ 201,352	$ 283,617	$ 259,829
Dividends on preferred stock	15,049	14,813	133,681	133,313	178,119	177,750
Surplus	$ 9,279	$ 13,663	$ 32,859	$ 68,039	$ 105,498	$ 82,079
Operating ratio	67.29%	65.31%	69.95%	67.87%	68.99%	69.44%

WEEKLY COMPARISONS OF CLOSING-BID PRICES OF SECURITIES OF LEADING ELECTRICAL COMPANIES.

Quotations furnished by F. M. Zeiler & Co., Rookery Bldg., Chicago.

Public Utilities—	Div. rate. Per cent.	Bid. Oct. 29.	Bid. Nov. 5.
Adirondack Electric Power of Glens Falls, common	6	12	12
Adirondack Electric Power of Glens Falls, preferred	6	..	..
American Gas & Electric of New York, common	16+extra	80	80
American Gas & Electric of New York, preferred	6	39	39
American Light & Traction of New York, common	..	225	223
American Light & Traction of New York, preferred	6	94	94
American Power & Light of New York, common	4	40	40
American Power & Light of New York, preferred	6	68	68
American Public Utilities of Grand Rapids, common	..	12	12
American Public Utilities of Grand Rapids, preferred	6	38	38
American Telephone & Telegraph of New York	..	105	109
American Water Works & Elec. of New York, common	..	7½	7½
American Water Works & Electric of New York, particip	7	13	14
American Water Works & Elec. of New York, first preferre	..	63	67
Appalachian Power, common	..	2	2
Appalachian Power, preferred	7	18	18
Cities Service of New York, common	+extra	280	287
Cities Service of New York, preferred	6	75½	75
Commonwealth Edison of Chicago	8	109	110
Comm. Power, Railway & Light of Jackson, common	..	22½	24½
Comm. Power, Railway & Light of Jackson, preferred	6	46	46½
Federal Light & Traction of New York, common	..	7¼	7¼
Federal Light & Traction of New York, preferred	..	35	35
Illinois Northern Utilities of Dixon	6	..	..
Middle West Utilities of Chicago, common	2+extra	25	25
Middle West Utilities of Chicago, preferred	6	50	49
Northern States Power of Chicago, common	..	52	57
Northern States Power of Chicago, preferred	ex.div.7	85	85
Pacific Gas & Electric of San Francisco, common	..	38	38
Pacific Gas & Electric of San Francisco, preferred	6	82	80
Public Service of Northern Illinois, Chicago, common	7	80	80
Public Service of Northern Illinois, Chicago, preferred	6	82	82
Republic Railway & Light of Youngstown, common	4	18	18
Republic Railway & Light of Youngstown, preferred	6	55	57
Standard Gas & Electric of Chicago, common	..	7½	9
Standard Gas & Electric of Chicago, preferred	6	31	31
Tennessee Railway, Light & Power of Chattanooga, common	..	3	3
Tennessee Railway, Light & Power of Chattanooga, preferre	6	12	14
United Light & Railways of Grand Rapids, common	4	35	35
United Light & Railways of Grand Rapids, preferred	6	66	66
Western Power of San Francisco, common	..	14	14
Western Power of San Francisco, preferred	6	59	54
Western Union Telegraph of New York	extra	90	92
Industrials—			
Electric Storage of Philadelphia, common	4	53	53
General Electric of Schenectady	8	154	155
Westinghouse Electric & Mfg. of Pittsburgh, common	7	44½	43½
Westinghouse Electric & Mfg. of Pittsburgh, preferred	7	63	62½